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Hawk

CI Block Server
User's Manual

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RETURNED MATERIAL—Warranty claims must be received by CMD within the applicable warranty period. A replaced product, or part thereof, shall become the property of CMD and shall be returned to CMD at Purchaser's expense. All returned material must be accompanied by a Return Materials Authorization (RMA) number assigned by CMD. For RMA numbers call CMD at (714) 454-0800.

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Return and Repair Policy

Warranty Period

The following warranty period is from the date of shipment:

CMD Controller	One year
Cable	90 days
Drives	Manufacturer's warranty

Return For Credit

The allowable period of return for credit from the date of shipment is as follows

CMD Controller	Less than 30 days
Cable	Less than 30 days
Drives	Not applicable

Return for Repair

CMD Controller	
In-Warranty (Less than 1 year)	CMD offers a *15 working day turnaround repair service* at the cost of parts only. Defective boards will be repaired and returned to the customer within 15 working days from that date that CMD receives the board. CMD also offers two *In-warranty 24 hour expediting services:* *24 Hour Turnaround Loaner Service:* Under this policy, CMD will ship a loaner in 24 hours during regular working days to the customer for a charge of $100.00 per loaner. Upon receiving the loaner, customer must return the defective board to CMD within seven (7) days for repair. CMD will repair the defective board and return the board to the customer. Customer must then return the loaner in seven (7) days after the receipt of the repaired board. Approval for loaner service is based on credit verification. *24 Hour Turnaround Swap Service:* In the case that the defective board is within the first six (6) months of the warranty, CMD, at its own option, offers a 24 hour turnaround swap service. CMD will ship the same model of the board to customer within 24 hours during working days in exchange for the defective board. CMD will swap with a new board if board is not functional upon arrival. For all other cases, swap will occur with either a new or refurbished board for a charge of $200.00. CMD does not offer swap services for boards that are purchased more than six months from the date of shipment. Customer is responsible for returning the defective board to CMD within seven (7) days after receipt of the swapped board. The remaining warranty period shall apply to the repaired or swapped board.
Out-of-Warranty (more than 1 year)	CMD offers a *15 working day turnaround repair service* at a rate of $300.00 plus parts and freight for all out-of-warranty Controllers. CMD will repair and return defective controllers within 15 working days from the date that CMD receives the controller. CMD also offers an *Out-of-Warranty 24 Hour Turnaround Loaner Service:* Under this policy, CMD will ship the same model loaner in the 24 hour time frame of working days to customer for an additional charge of $100.00 plus freight per loaner. The loaner is for use by the customer during the period that the defective board is being repaired. Customer is responsible for returning the defective board to CMD within seven days after the receipt of loaner and returning the loaner in seven (7) days once the defective board is repaired and received. The approval of the loaner service is at CMD's option and based upon customer credit verification. CMD will extend warranty for a period of six (6) months on any out-of-warranty repaired board.

Cable	
In-Warranty (90 days)	Free swap
Out-of-Warranty (90 days)	Not applicable
Drives	
In-Warranty (per manufacturer)	Manufacturer charge only.
Out-of-Warranty (per manufacturer)	manufacturer charge plus $100 CMD handling.

Return for Upgrade / Update

CMD Controller	
In-Warranty (less than 1 year)	CMD offers a *15 working day turnaround different function upgrade service* for boards that can be upgraded to a higher function; and a *free 15 working day turnaround ECO Field Upgrade* for all its boards. CMD will *upgrade* the hardware of its board to a higher function for a charge of the difference of list prices of the original and upgraded functions. CMD will also update its board to its latest firmware release at no charge to the customer. Boards will be upgraded/updated and returned to the customer within 15 working days from the date that CMD receives the board. CMD also offers *24 hour turnaround loaner service* as stated in "Return for Repair." The remaining warranty period shall apply to the updated board. For upgraded boards, CMD will extend warranty for a period of six months.
Out-of-Warranty (More than 1 year)	CMD offers a *15 working day turnaround different function upgrade service* for boards that can be upgraded to a higher function at a charge of the difference of list prices of two functions. CMD also offers a *free 15 working day turnaround ECO Field Upgrade* for all its boards. Boards will be upgraded/updated and returned to customer within 15 working days from the date that CMD receives the board. CMD also offers *24 hours turnaround Loaner Service* as stated in "Return for Repair." There will be no warranty extension for same function firmware update. For different function Hardware upgrade, CMD will extend warranty for a period of six (6) months.
Drives	Same as in "Return for Repair."

Shipping Charges

The following shipping charges apply to all REPAIR, SWAP, LOANER, and UPGRADE UNITS.

In-Warranty	
Domestic	Freight from CMD to customer is to be paid by CMD; freight from customer to CMD is to be paid by customer.
International	All fees are to be paid by customer (including custom duty and broker fees).
Out-of Warranty	
Domestic	All fees are to be paid by customer.
International	All fees are to be paid by customer (including custom duty and broker fees).

General Conditions

All goods returned to CMD including returns for credit, swap returns, loaner returns, and evaluation returns shall remain in good condition. Any damage or alteration done by the customer will result in a rejection or additional charge to the customer.

A customer who receives a board that is defective upon arrival must contact CMD Technical Support and obtain authorization before returning the board for repair or replacement. CMD Sales personnel must be consulted for authorization of returned goods for credit and/or evaluation.

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Chapter 1

Introduction

This chapter briefly describes the functions and summarizes the features of the Hawk CI block server. The succeeding chapters in this manual provide detailed information on installing, configuring and using the Hawk.

The Hawk Series

The CSV-8100 acts as a target on the DSSI bus and can communicate with hosts only. It is not designed to play the role of initiator to DSSI storage devices.

The Hawk series comprises two products: the CSV-8000 and the CSV-8100. Both provide a means for CI-based VAX and AXP computer systems to share a common farm of SCSI devices. But while the CSV-8000 can transmit and receive over the CI only, the CSV-8100 can communicate over DSSI as well, enabling CI- and DSSI-based systems to share storage devices. This manual uses the name Hawk to refer to both the CSV-8000 and the CSV-8100, unless otherwise noted.

Features

The Hawk can control up to 42 SCSI devices—36 devices if you choose to use redundant Hawk servers. These devices can be redundant arrays of independent disks (RAID), solid state disks, disk drives, tape drives, CDROMs or optical devices. For a complete list of supported devices, call CMD Technology and request the "Qualified Peripherals List" for the Hawk.

The Hawk is fully compliant with Digital's mass storage protocols, MSCP and TMSCP. There is no need for additional software drivers.

For faster read performance, you may install up to 512 megabytes of cache memory, in the form of standard 72-pin SIMMs. The Hawk's firmware permits you to control which devices are to be cached.

The Hawk comes with a 3.5-inch high-density disk drive for loading firmware code and configuration information at bootup. You may obtain firmware upgrades from CMD Technology's BBS: set your modem to 8 data bits, 1 stop bit, no parity and dial (714) 454-1134 or (714) 454-0795. The BBS supports up to 9600 baud. Use a DOS-based computer to transfer the file to the bootup diskette, reinsert the diskette in the Hawk and reboot. You may also use any ASCII editor to modify the Hawk's configuration file, which contains instructions for setting system and device parameters.

Utilities for formatting, qualifying and testing devices are available through the Diagnostics Utilty Protocol (DUP).

By connecting a monitor to the Hawk's dedicated RS232 port, you may view various displays designed to help you determine the controller's current status and configuration options at any given moment.

The Hawk's chassis is a standard 5.25" rack mount with dual power supplies and dual cooling fans for added reliability.

Specifications

■ **Table 1-1 Hawk Technical Specifications**

General	
Emulation	MSCP (DU) and TMSCP (MU)
Host Bus Interface	Digital CI (CSV-8000) Digital CI and DSSI (CSV-8100)
Peripheral Bus Interface	SCSI-1, SCSI-2, "Fast" SCSI-2
Maximum Cable Length	SCSI ≤ 5 MB/sec transfer rate: 6 meters (19.5 ft.) SCSI > 5 MB/sec transfer rate: 3 meters (9.9 ft.) CI: 45 meters (147.65 ft.)
Maximum Hosts Supported	Up to 32
Connector Type	CI: Standard TNC CI connector DSSI (CSV-8100): Dual row 50-pin male Honda SCSI: Dual row 50-pin female Honda
Command Queuing	Commands from host: Up to 60 with seek optimization SCSI command tag queuing: Up to 64 commands per drive
Firmware Load Media	3.5" 1.44 MB high density diskette

User Interface	Dedicated RS232 console interface for setup, status monitoring and diagnostics
CI Host Connection Support	SC008 Star Coupler, CIXCD, CIBCA, CIBCI, CI750 and CI780
DSSI Host Connection Support (CSV-8100 only)	VAX 3300/3400, VAX 4000, AXP 4000, KFMSA and DEC 5400/5500
Operating System Support	VMS 5.4 and above OpenVMS AXP 1.5 and above OSF/1 1.5 and above

Performance	
Maximum Sustained QIOs (<100 ms response time)	Single server: 1800 demonstrated QIOs Dual server: 3250 demonstrated QIOs

Environmental	
Temperature	Operational: 5° C to 50° C Non-operational: -40° C to +60° C
Relative Humidity	Operational: 10% to 85% non-condensing Non-operational: 5% to 90% non-condensing

Power Requirements	
Input Voltage	110 VAC to 240 VAC single phase, AutoRanging
Input Frequency	50 to 60 cycle AC
Input Current	2A @ 115 VAC (100 watts), 1A @ 230 VAC (110 watts)

Physical	
Unit Size Hawk Controller Chassis	Standard 5.25" high rack mount 5.2" x 19" x 24.5" (HxWxD)

Chapter 2

CI Setup

CI Cluster Configuration

The installation of a Hawk server can dramatically increase the amount of traffic on the computer interconnect (CI). For this traffic to flow smoothly, it is essential that you configure your CI cluster so that all nodes have unique CI node numbers and common slot count, node count and header length settings. This chapter contains information about how to set these parameters on the Hawk. Consult the user's manuals for the host adapters and any other controllers in your cluster for information about configuring these devices.

The Hawk is compatible with all CI host adapters and star couplers. However, your CI cluster environment should conform with the following guidelines recommended by Digital Equipment Corporation.

■ **Table 2-1 Minimum Revision Levels**

	Environment	
Device	**1-16 Nodes (SC008)**	**1-32 Nodes (CISCE)**
VMS	v. 5.4	v. 5.4
CIXCD		
T2080	Rev. E02	Rev. E02
CIXCD.BIN	v. 1.0	v. 1.0
HSC		
Link Module	L0100 Rev. E or L0118 Rev. B	L0118 Rev. B
CRONIC		
HSC50	v. 400	v. 400
HSC40/70	v. 500	v. 500
CI7x0, CIBCI		
Link Module	L0100 Rev. E or L0118 Rev. B	L0118 Rev. B
CI780.BIN/L0101	Rev. 8.7/L0101 Rev. K or Rev. 20.20/L0101-YA	Rev. 20.20/L0101-YA
CIBCA-A		
CIBCA.BIN	Rev. 7.5	Rev. 7.5
CIBCA-B		
CIBCB.BIN	Rev. 5.2	Rev. 5.2

Board Configuration

A DIP switch (located at S1 on the Hawk board) controls the CI node number, CI slot count, CI node count and CI header length for the Hawk. Each of these parameters must be set to a value appropriate for your cluster for the Hawk to operate properly. This section describes the default parameter settings and how to change these settings if necessary.

Default Settings

The following table lists the Hawk's default CI parameter settings. While these defaults will be appropriate for many clusters, you should carefully evaluate them in relation to your own cluster before accepting them.

- **Table 2-2 Default CI Parameters**

Parameter	Default Value
CI Node Number	15
CI Slot Count	10
CI Node Count	1 to 16 nodes
CI Header Length	5 bytes

"CI Slot Count" is synonomous with "delta time," "tick count," "quiet time" or "quiet slot."

Modifying Your Configuration

Should you find that the Hawk's default settings are not appropriate for your cluster, you will need to open the cabinet and manipulate the switches on DIP switch S1. The remainder of this chapter describes the four CI parameters and offers some advice for choosing an appropriate value for your cluster. Please see Appendix A for a complete listing of DIP switch settings.

CI Node Number

The CI node number is one of the unique identifiers of the Hawk on the computer interconnect. You must make sure that the Hawk's node number does not conflict with any other node's number. Select the lowest available node number for the Hawk. Because of the way CI rules determine how nodes may take control of a CI path, it is beneficial to "pack" the lower node number values.

Switches 1 through 5 on DIP switch S1 determine the node number of the Hawk. Each switch represents one bit of a five-bit binary number, which can range from 0 to 31. Switch 1 is the least significant bit and switch 5 is the most significant bit. "OFF" equals 1 and "ON" equals 0.

Table A-1 on page A-2 lists the switch settings for all possible node numbers.

CI Slot Count

The CI slot count is the number of 114-nanosecond intervals that form the "quiet slot." The quiet slot is the basic unit of measurement used when nodes are arbitrating to acquire ownership of a CI path. According to the CI path arbitration algorithm, a node seeking to transmit data on a path, must wait a certain number of quiet slots and determine that the path is inactive before beginning the transmission. The number of quiet slots a node must count down is equal to the sum of its node number, the node count (see below) and one. If the node detects that another node has control of the path during the interval, it restarts its countdown, either from the original number of quiet slots or a lesser number, depending on whether the other node's number is higher or lower. The purpose of the arbitration algorithm is twofold. First, it keeps two nodes from jumping on the CI path at the same time. Secondly, it prevents any single node from dominating the interconnect.

The CI slot count you select must be the same as all other CI adapters in the cluster. A slot count of 10 (the Hawk's default value) is used by the majority of adapters, but there are some adapters that allow other values. Consult the manuals for the CI adapters in your cluster to determine their common slot count ("delta time" for DEC adapters) and set the Hawk accordingly.

Switches 6 and 7 on DIP switch S1 set the slot count for the Hawk. Table A-2 on page A-2 lists the switch settings for each slot count value.

CI Node Count

The CI node count refers to the number of nodes on the computer interconnect. The Hawk permits just two alternatives for this parameter. If your CI has 1 to 16 nodes, set switch 8 to the "OFF" position. If you have 17 to 32 nodes, set switch 8 to the "ON" position.

Table A-3 on page A-3 lists the switch settings for the CI node count parameter.

CI Header Length

Each packet transmitted on the CI contains a header that identifies the target node and characterizes the content of the packet. The Hawk's default header length of five bytes is used by virtually all CI adapters. Yet some adapters offer the option for a 15-byte header, so the Hawk offers this option as well for the sake of compatibility.

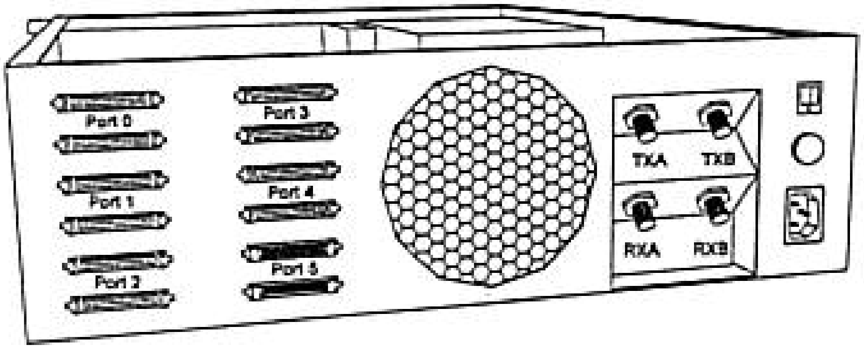
You must select a common header length for every CI node on the interconnect.

Table A-4 on page A-3 lists the switch settings for CI header length.

Cabling

After you have verified that all CI parameters are correct, run CI cables from your star coupler to the CI connectors on the back of the Hawk enclosure. Connect the transmit cable for path A to TXA, and the receive cable for path A to RXA. Likewise, connect the transmit cable for path B to TXB, and the receive cable for path B to RXB. The following illustration shows the placement of the CI connectors on the back of the CSV-8100 enclosure.

Be sure to verify that the Hawk's CI parameters are correct and do not conflict with other nodes on the interconnect before cabling the Hawk to the star coupler. Failure to take this precaution could cause other nodes connected to the star coupler to crash.



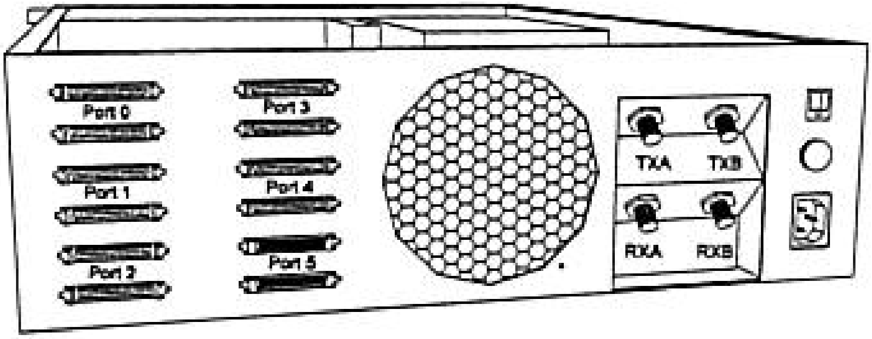
CSV-8100 enclosure back view.

Chapter 3

DSSI-SCSI Ports

Cabling

The CSV-8000 comes with all ports configured for SCSI. The CSV-8100 comes with ports 0 through 4 configured for SCSI and port 5 configured for DSSI. The following illustration shows the placement of the port connectors on the back of the CSV-8100 enclosure (the CSV-8000 enclosure would have all SCSI ports). SCSI ports are always equipped with high-density female connectors, and the DSSI port is always equipped with high-density male connectors. Each port has an "in" and an "out" connector.



CSV-8100 enclosure back view

For peak performance, it is essential that you use high-quality SCSI cables when connecting devices to the Hawk. The SCSI-3 proposal recommends that the total length of a SCSI cable on any single bus should be no longer than three (3) meters or (9.9 feet) when the transfer rate is 10 MBytes/second. When you measure your cables, be sure to take into account the distance of the internal cable within the Hawk enclosure (approximately 34 inches or 86 centimeters).

In addition to meeting the length limitation, cables should adhere to the following specifications.

■ **Table 3-1 SCSI Cable Specifications**

Characteristic Impedance	No less than 90 ohms and no greater than 140 ohms
Signal Attenuation	.095 dB maximum per meter at 5 MHz
Pair-to-pair Propagation Delay Delta	.15 nanoseconds maximum per meter
DC Resistance at 20 degrees C	.23 ohms maximum per meter

Termination

CMD Technology recommends that you use external termination on all SCSI and DSSI buses connected to the Hawk. The Hawk comes with six external SCSI terminators. These should be plugged in to one end of each interconnect. Typically, this will mean that you should plug a terminator into either the "in" or "out" connector of each port connector pair on the back of the enclosure.

The Hawk uses active termination for its SCSI buses. DSSI buses on the CSV-8100 use passive termination. For SCSI buses, you should terminate the other end of the bus with either an active terminator or some other form of high-quality terminator (such as FPT). For DSSI buses, terminate the other end of the bus with a passive DSSI terminator.

If you wish to use the Hawk's on-board termination, you will have to open the enclosure and configure the appropriate resistors and jumpers for each port. See Appendix A for detailed instructions.

Term Power

By default, the Hawk supplies term power on all ports. At least one device on any DSSI or SCSI interconnect must supply term power to the terminators. There is no harm in having more than one device supply term power. In fact, the ideal situation is to have the devices at each end of the interconnect supply term power.

If you wish to prevent the Hawk from supplying term power, you will have to open the enclosure and configure the appropriate jumpers for each port. See Appendix A for detailed instructions.

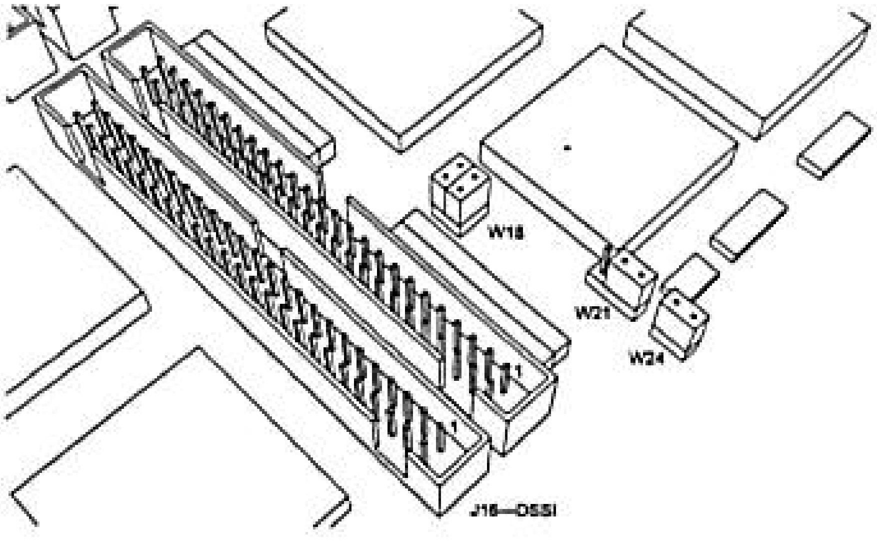
Modifying CSV-8100 Default Cabling

If you have no need for a DSSI port on the CSV-8100 and wish to have all SCSI ports, you may change port 5 from DSSI to SCSI. Likewise, if you need two DSSI ports, you may change port 4 from SCSI to DSSI. The next two sections explain how to make these changes.

Changing Port 5 from DSSI to SCSI

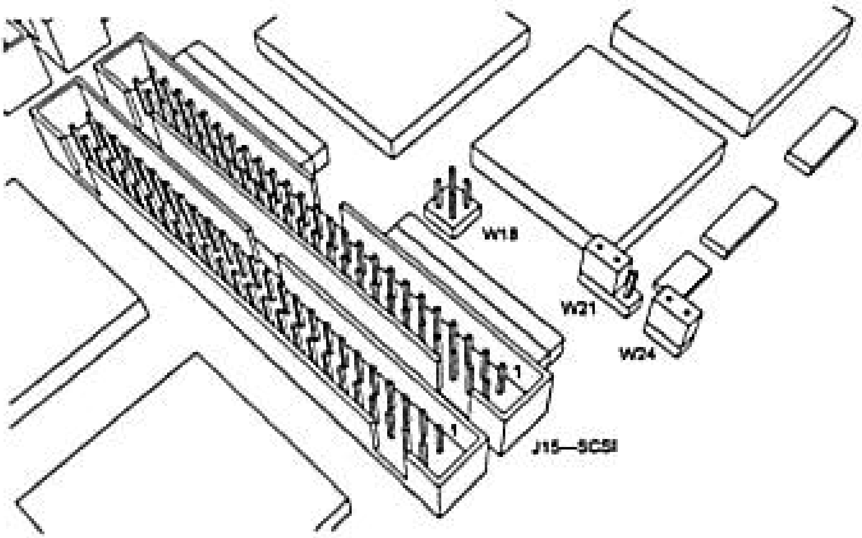
To change port 5 from DSSI to SCSI, remove the DSSI cable from connector J16 on the circuit board and unscrew the connectors for the cable from the back of the enclosure. Take the extra SCSI cable supplied with the CSV-8100 and attach the two high density connectors to the back of the enclosure. Plug the internal connector to J15 on the circuit board. Be sure to align pin one on the cable with pin one at J15.

If you have not changed the default jumper settings, the jumpers for port 5 should look like the following illustration. See page A-15 for a full description of the configuration options for Port 5.



CSV-8100 Port 5 configured for DSSI

You will need to change the shunt on jumper W21 from pins 2-3 to pins 1-2. This will direct term power to the SCSI connector J15. The two shunts on jumper W18 apply only to the DSSI connector J16. They have no effect on connector J15. You may leave them in or remove them at your option. After you have changed the jumpers, they should look like the following illustration.



CSV-8100 Port 5 configured for SCSI

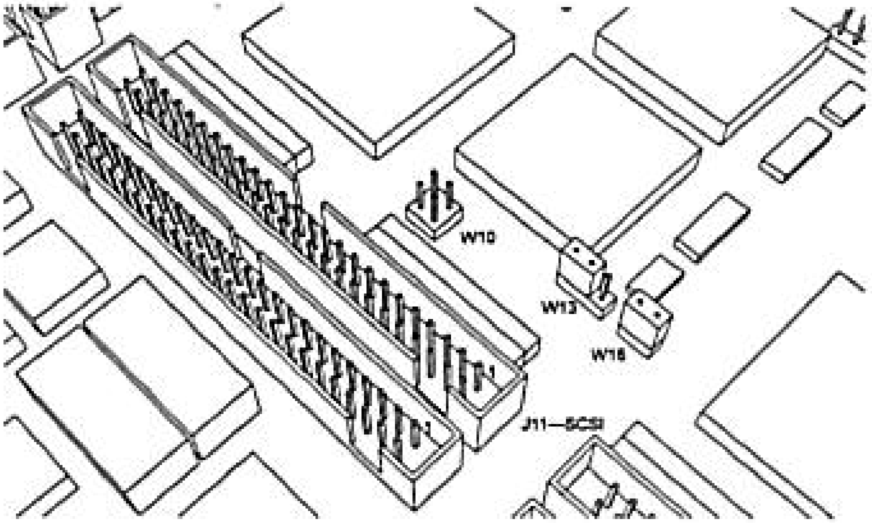
Finally, you must edit the "PORT5" section of the floppy configuration file. Change the "type" value from DSSI to SCSI. Strike "node_id" and replace it with "initiator_id." Set "initiator_id" equal to the SCSI ID you wish to assign to port 5. You may also edit other configuration parameters for port 5. See "Editing the Configuration File" on page 3-6 for detailed instructions.

Changing Port 4 from SCSI to DSSI

Changing port 4 from SCSI to DSSI entails reversing the steps of the previous section—except the jumper label numbers are different. In addition, CMD Technology does not provide an extra DSSI cable with the CSV-8100. If you need to add another DSSI port, you must purchase a set of internal DSSI cables from CMD.

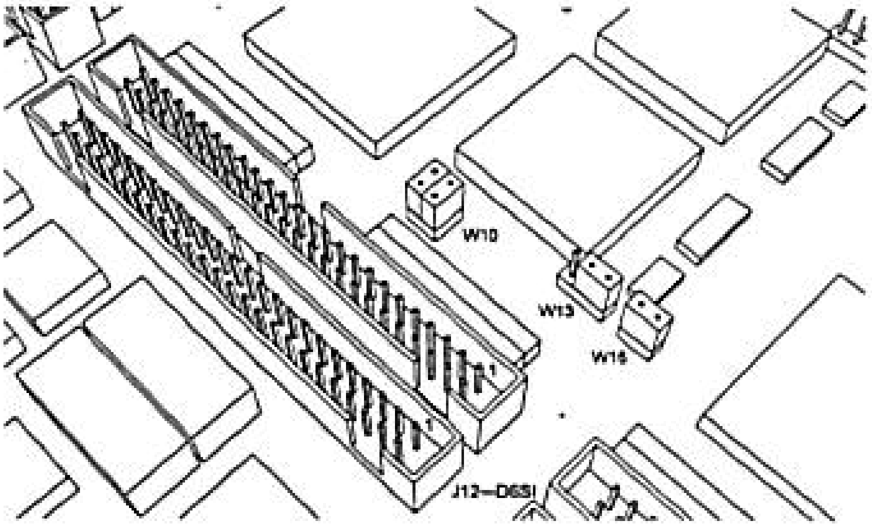
Replace the SCSI cable with the DSSI cable you have obtained from CMD Technology. Insert the internal connector into the socket at J12 and secure the high-density connectors to the back of the enclosure.

The following illustration shows the default jumper positioning for port 4 configured as a SCSI port. See page A-13 for a full description of configuration options for Port 4.



CSV-8100 Port 4 configured for SCSI

To configure the port for DSSI, you must move the shunt at jumper W13 from pins 1-2 to 2-3. Additionally, install shunts on pins 1-2 and 3-4 of jumper W10. The following illustration shows what the jumpers should look like for a DSSI configuration.



CSV-8100 Port 4 configured for DSSI

Finally, you must edit the "PORT4" section of the floppy configuration file. Change the "type" value from SCSI to DSSI. Strike "initiator_id" and replace it with "node_id." Set "node_id" equal to the DSSI ID you wish to assign to port 4. You may also edit other configuration parameters for port 4. See "Editing the Configuration File" on page 3-6 for detailed instructions.

Bootup Floppy Diskette

Each time you power on or reset the Hawk, the board downloads its firmware and configuration data from the 3.5" DSHD boot up floppy diskette. The Hawk will not operate unless you have the boot up diskette inserted in the floppy drive integrated into the enclosure. See the next section for instructions on how to modify the configuration file.

Editing the Configuration File

The configuration file on the Hawk's bootup floppy diskette is a standard ASCII file that you can edit on any PC. By editing the file, you may change a number of the Hawk's configuration parameters, including the DSSI node ID or SCSI ID of any port.

There are three steps you must take to edit the configuration file and have the changes take effect.

- ☐ Use any ASCII editor on a PC to modify the file CSV8K.CFG on the bootup floppy diskette. ASCII editors include EDLIN, a line editor available in all DOS versions, EDIT, a full-screen editor available in DOS versions 5.0 and above, or any full-featured word processor that can import and export plain text files. Save your changes when you are done.
- ☐ Execute the file CSC.EXE on the text file you just edited. This will compile the text file into a binary file with the name CSV8K.BIN. If your text file contains any errors, CSC.EXE will point them out to you. The program will not create the binary file until your text file is free of errors. Use the following instruction to execute CSC.EXE on the text file CSV8K.CFG.

```
CSC CSV8K.CFG
```

- ☐ Insert the floppy diskette into the floppy drive in the Hawk cabinet and reset the board, either by turning power to the unit off and back on, or by pressing the reset button (S2) on the Hawk circuit board.

You may create alternative configuration file versions and save them for testing or other special circumstances. Each must have its own unique filename that complies with DOS naming rules. Compile each text file with CSC.EXE as explained above, replacing CSV8K.CFG with the name of your alternative file. CSC.EXE will create a binary file with the same filename and and the extension BIN. To have the Hawk boot up using an alternative configuration file, you must rename the binary version of the file to CSV8K.BIN. The Hawk searches for this specific filename when booting up.

The following is an example of the Hawk's default configuration file. Note that comments (explanatory text that is ignored by the compiler) must be entered in one of two formats...

```
// This is a comment.
```

...if the comment begins and ends on the same line, or...

```
/* This is a
   comment. */
```

...if the comment extends beyond the end of one line (may also be used on a single line).

```
CSC CSV8K.CFG
// This is a comment.
Instruction   /* This is a comment. */
/*
  CSV8K.CFG—Configuration file for a CSV-8000 system
*/
SYNTAX= ( version=1.0 )
COMMENT= "Config Built on"  /* up to 19 character MAX */
SCS=  (
          nodename="131072",
          systemid=131072,
          max_hosts=32
      )
DISK= (
          allocation_class=1,
          max_cached_units=8,
          disconnect=on,
          device_type=DU,
          sync_rate=7,
          cache=on,
          immed=on,
          spndwn=on,
          tag_queue=on
          disk_name_algorithm=(port*100) + (10*id) + (1*lun) + 0
      )
TAPE= (
          allocation_class=1,
          device_type=MU,
          sync_rate=5,
          tag_queue=off,
          fast_tape_mark_search=off,
          exabyte_short_tmark=off,
          tape_name_algorithm=(port*100) + (10*id) + (1*lun) + 0
      )
PORT_DEFAULTS= (
          scanning=dense,
          scan_rate=60,
          pon_reset=on
      )
PORT0=   ( type=SCSI, initiator_id=7 )
PORT1=   ( type=SCSI, initiator_id=7 )
PORT2=   ( type=SCSI, initiator_id=7 )
PORT3=   ( type=SCSI, initiator_id=7 )
PORT4=   ( type=SCSI, initiator_id=7 )
PORT5=   ( type=DSSI, node_id=0 )
/* End of Configuration */
```

When you edit the file, be sure to separate each parameter with a comma and enclose all the parameters in each section in parantheses. You may insert spaces and hard returns to improve the legibility of the file. They will be ignored by "CSC.EXE."

Section Descriptions

There are eleven significant sections in the configuration file. Each focuses on a specific aspect of the Hawk's operation.

Syntax

This section identifies the syntax version of the configuration file. This section should not be changed.

Comment

You may enter a comment up to 19 characters long in this section.

SCS

The SCS section defines three parameters used by the Systems Communications Services of VMS. System Communication Services are defined by the System Communication Architecture, the framework that manages transmissions of data among nodes in a cluster.

nodename: This is a name used by SCS to idenfify the Hawk. You may enter any name you wish, as long as it is no longer than six characters, contains no dollar sign ($) or underscore (_) characters, and is unique among all nodes in the cluster.

systemid: Each node in the cluster must have a unique system ID. You may enter any number between one and 268435456 as a system ID. The default value is 131072 plus the serial number of your Hawk.

max_hosts: Set this parameter to a value that is greater than or equal to the number of host systems in the cluster, but no greater than 32. The primary use of the max_hosts parameter is in disk and tape credit allotment. This parameter is not related to the controller's CI node count setting.

Disk

The "DISK" section defines the default values for all disk devices controlled by the Hawk. You may override these values for any particular device (see page 3-11).

allocation_class: If you want to have all storage devices available clusterwide, you must assign the devices to the same allocation class. This allocation class, in turn, must agree with the allocation class defined by

SYSGEN. This parameter may be set to any whole number between 0 and 255.

max_cached_units: Use this parameter to inform the Hawk how many disk drives will be cached. This information is used by the Hawk to allocate cache resources. The maximum value allowed for max_cached_units is 255.

disconnect: There are only two possible values for this parameter: "on" or "off." When set to "on," this parameter allows SCSI disk devices that support this feature to disconnect from the SCSI bus while processing a I/O request and then reconnect when they are ready to transmit a response back to the initiator. You should turn disconnect "off" when only one device is on a SCSI bus.

device_type: This parameter determines the default device type for disk devices controlled by the Hawk. You have two choices: DU, the standard disk type for UDA disks, or DI, the disk type for DSSI disks. Neither device type carries any advantage over the other in terms of performance or serving ability.

sync_rate: This is the maximum rate (in megabytes per second) at which the Hawk will attempt to transfer data synchronously along the SCSI interconnects. If a device does not support the synchronous transfer rate specified by this parameter, the Hawk will negotiate downwards until it reaches a rate supported by the device. The sync_rate parameter may be set to 0, 5, 6, 7, 8, 9 or 10. A sync_rate of 0 puts the Hawk into asynchronous transfer mode.

tag_queue: Enables ("on") or disables ("off") tag queuing. Tag queuing permits each initiator to issue commands accompanied by instructions for how the target should handle the command. The initiator can specify whether each command should be executed by the target at the first opportunity, in the order in which it was received, or at a time deemed appropriate by the target. Permits each initiator to have multiple commands outstanding and each target to optimize the commands it receives.

cache: When set to "off," this parameter prevents the caching of data from all disk drives. Set to "on" to enable caching.

immed: When set to "on," this parameter sets the IMMEDIATE bit in the SCSI STOP and START commands. You should turn this parameter "off" if you have a Sony optical disk drive connected to the Hawk. When set to "off," the VMS prompt will not return until the drive's media is ejected or the drive has spun down.

spndwn: When set to "on," the Hawk will spin down drives or eject media when the operating system issues a spin down command such as the VMS DISMOUNT/UNLOAD command. This parameter may set set either "on" or "off."

disk_name_algorithm: This is the formula the Hawk uses to create disk device unit numbers, which are a component of physical device names. For example, the default settings for allocation_class, device_type and disk_name_algorithm will result in a device name of $1$DU1120 for a disk device on port 1, SCSI ID 2 and LUN 0. You may edit the coefficients and the constant in this formula but not the structure, which must remain port times a coefficient plus id times a coefficient plus lun times a coefficient plus a constant. You may make a coefficient zero, in which case you are allowed to omit that term. You may override this formula and enter a specific device name for any device (see page 3-11). VMS will not recognize unit numbers greater than 9999, so make sure that your algorithm does not produce a value that exceeds 9999.

Tape

allocation_class: If you want all tape devices to be shared cluster-wide, you must assign them to the same allocation class. This allocation class, in turn, must agree with the allocation class defined by SYSGEN.

device_type: This parameter determines the default device type for tape devices controlled by the Hawk. The Hawk supports only one value for this parameter: MU.

disconnect: There are only two possible values for this parameter: "on" or "off." When set to "on," this parameter allows SCSI tape devices that support this feature to disconnect from the SCSI bus while processing a I/O request and then reconnect when they are ready to transmit a response back to the initiator. You should turn disconnect "off" when only one device is on a SCSI bus.

fast_tape_mark_search: When set to "on," this parameter enables high speed forward and reverse filemark searching. This mode can increase tape drive performance, but it should not be used when you intend to perform a VMS standalone backup.

exabyte_short_tmark: When set to "on," this parameter enables the writing of short filemarks on Exabyte devices. When disabled all filemarks will be written as long filemarks.

sync_rate: This is the maximum rate (in megabytes per second) at which the Hawk will attempt to transfer data synchronously along the SCSI interconnects. If a device does not support the synchronous transfer rate specified by this parameter, the Hawk will negotiate downwards until it reaches a rate supported by the device. The sync_rate parameter may be set to 0, 5, 6, 7, 8, 9 or 10. A sync_rate of 0 puts the Hawk into asynchronous transfer mode.

tag_queue: Enables ("on") or disables ("off") tag queuing. Tag queuing permits each initiator to issue commands accompanied by instructions for how the target should handle the command. The initiator can specify whether each command should be executed by the target at the first opportunity, in the order in which it was received, or at a time deemed appropriate by the target. Permits each initiator to have multiple commands outstanding and each target to optimize the commands it receives.

tape_name_algorithm: This is the formula the Hawk uses to create tape device unit numbers, which are a component of physical device names. For example, the default settings for allocation_class, device_type and tape_name_algorithm will result in a device name of $1$MU1120 for a tape device on port 1, SCSI ID 2 and LUN 0. You may edit the coefficients and the constant in this formula but not the structure, which must remain port times a coefficient plus id times a coefficient plus lun times a coefficient plus a constant. You may make a coefficient zero, in which case you are allowed to omit that term. You may override this formula and enter a specific device name for any device (see page 3-11). VMS will not recognize unit numbers greater than 9999, so make sure that your algorithm does not produce a value that exceeds 9999.

Port_Defaults

scanning: When set to "dense," this parameter will cause the Hawk to periodically scan all SCSI buses for new devices. The scan will begin at SCSI ID 0, LUN 0 and progress through each LUN of each ID until it finds a vacant address. When the Hawk finds a vacant LUN it begins searching the next greater ID. When it finds a vacancy on LUN 0 of any ID, it ceases the scan. This means that you must "pack" devices on each SCSI bus. The Hawk will not find a device if there is a vacant LUN between it and the preceding device on the same bus. The scanning frequency is determined by the scan_rate parameter. When scanning is set to "none," the Hawk will perform one scan on each SCSI bus at powerup and none thereafter.

scan_rate: This is the interval in seconds between SCSI bus scans. The range of values allowed is 1 to 255.

pon_reset: If pon_reset is turned "on" in the "PORT_DEFAULTS=" section, the Hawk will issue a SCSI bus reset at power on. Set this parameter to "off" to disable this feature.

Port

The port sections of the configuration file specify the parameters for each DSSI/SCSI port. See the illustration on page 2-4 for the location of these ports on the back of the CSV-8100 enclosure.

type: This parameter specifies the type of interconnect for the port. The choices are "DSSI" or "SCSI."

initiator_id: This parameter sets the Hawk's SCSI ID on the SCSI bus connected to the port. The Hawk is the initiator on all SCSI buses. Valid values range from 0 to 7. SCSI ID 7, which carries the highest priority, is usually assigned to the initiator.

node_id: This is the CSV-8100's node ID on the DSSI bus connected to the port. Valid values range from 0 to 7.

Overriding Configuration Values

You may override any DISK or TAPE value for any particular device on a device-to-device basis. The following example shows a configuration file with several overrides. The example also includes changes to the nodename and systemid parameters.

```
CSC CSVBK.CFG
// This is a comment.
Instruction   /* This is a comment. */
/*
  CSVBK.CFG-Configuration file for a CSV-8000 system
*/
SYNTAX= ( version=1.0 )
COMMENT= "Config Built on"  /* upto 19 character MAX */
SCS=  (
          nodename="HAWK",
          systemid=257147,
          max_hosts=32
      )
DISK= (
          allocation_class=1,
          max_cached_units=8,
          disconnect=on,
          device_type=DU,
          sync_rate=7,
          cache=on,
          immed=on,
          spndwn=on,
          tag_queue=on
          disk_name_algorithm=(port*100) + (10*id) + (1*lun) + 0
      )
TAPE= (
          allocation_class=1,
          device_type=MU,
          sync_rate=5,
          tag_queue=off,
          fast_tape_mark_search=off,
          exabyte_short_tmark=off,
          tape_name_algorithm=(port*100) + (10*id) + (1*lun) + 0
      )
PORT_DEFAULTS= (
          scanning=dense,
          scan_rate=60,
          pon_reset=on
      )
PORT0=   ( type=SCSI, initiator_id=7 )
PORT1=   ( type=SCSI initiator_id=7,
            override= ( id=4, lun=0, device=MUA0, sync_rate=10,
                         fast_tape_mark_searoh=on ),
            override= ( id=5, lun=0, device=MUA1 )
         )
PORT2=   ( type=SCSI, initiator_id=7,
            override= ( id=0, lun=0, device=DIA0, cache=off ),
            override= ( id=1, lun=0, device=DIA1 ),
            override= ( id=2, lun=0, device=DIA2 )
         )
PORT3=   ( type=SCSI, initiator_id=7,
            override= ( id=3, lun=0, device=DIA3, tag_queue=off)
         )
PORT4=   ( type=SCSI, initiator_id=7 )
PORT5=   ( type=DSSI, initiator_id=7 )
/* End of Configuration */
```

To override parameters for a device, just specify the ID and LUN of the device on a particular port, then enter the new parameter values. Override introduces a new parameter called "device." This parameter allows you to directly enter a device name, bypassing the device_type and name_algorithm defaults.

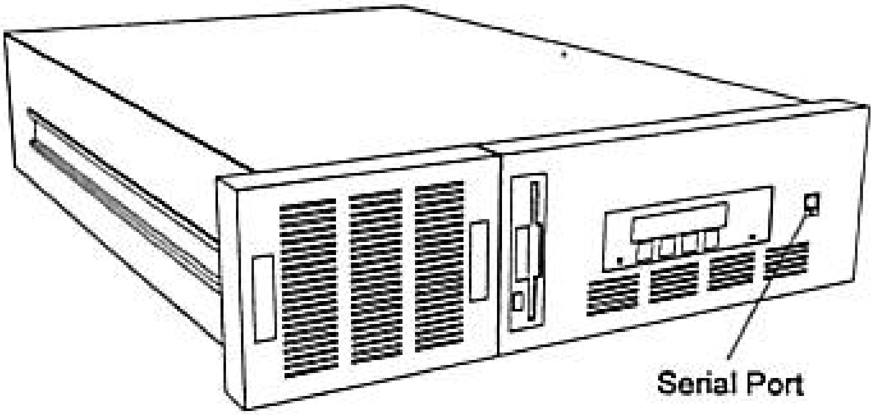
Chapter 4

Monitor Utility

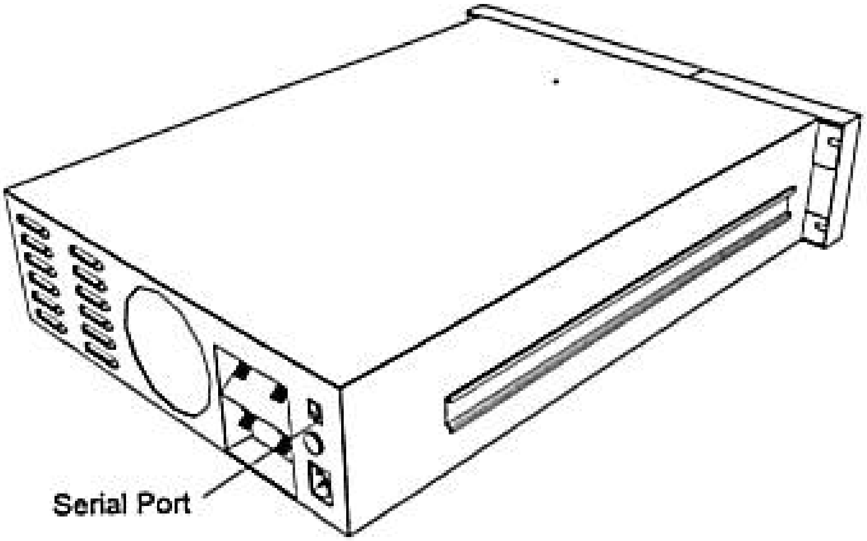
The monitor utility displays helpful information concerning the configuration and operation of the Hawk.

Connecting to a Monitor

The serial cable that comes with the Hawk has a telephone-style plug at one end for connecting to the Hawk enclosure and a DB-25 connector at the other end for connecting to any standard monitor. There are two serial ports on the Hawk enclosure, one on the front and one on the back. Either may be used to gain access to the monitor utility.



Location of serial port on front of enclosure



Location of serial port on back of enclosure

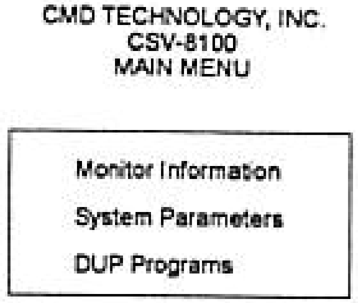
Set your terminal's communications parameters to 9600 baud, 8-bit data, 1-stop bit, no parity, jump scroll.

Accessing the Monitor Utility

If you have the monitor connected at power up, you will see a series of boot up messages appear on the screen as the Hawk loads its operating code from the floppy diskette. At the conclusion of the boot up routine, the monitor utility will display a message box containing the serial number, SCS nodename, SCS system ID and firmware version number of your Hawk.

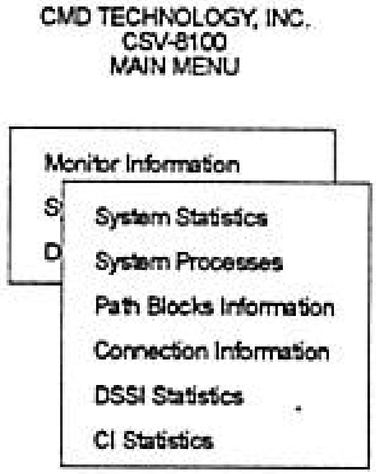
```
                    CMD TECHNOLOGY, INC.
                          CSV-8100


   Serial No: 6                          Version: A0 (x23)
   Nodename: HAWK                        System ID: 131072


                  press any key to continue
```

The main menu will appear as soon as you press a key.



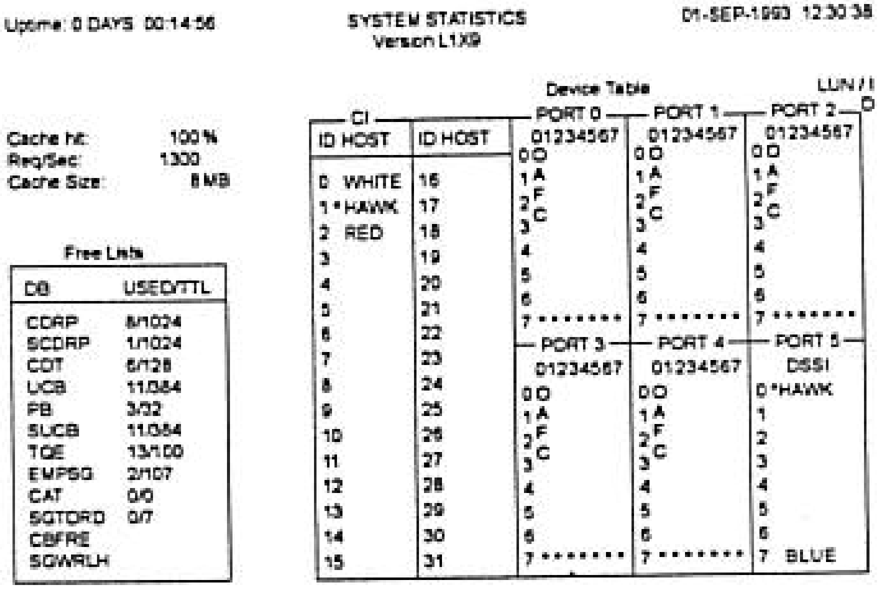
The opening menu presents you with three options: Monitor Information, System Parameters and DUP Programs. Use the cursor keys to highlight an option and press ENTER to select it. You may press Ctrl-Z at any time to exit a screen and move up to the previous level in the menu tree. You may exit the monitor utility altogether by pressing Ctrl-Z at the main menu.

The DUP Programs menu option is explained in chapters 6, 7 and 8. System Parameters takes you immediately to the System Parameters screen, which presents a read-only display of the Hawk's configuration parameters. For a full explanation of this screen, see page 4-10. If you select Monitor Information, the utility will display a secondary menu with five choices as illustrated in the following screen recreation.



System Statistics

System Statistics provides an inventory of all the target devices and hosts connected to the Hawk. For CI and DSSI buses, the screen displays which nodenames are located on which node IDs. For SCSI buses, the screen shows the ID of the Hawk on each bus, as well as the status of all target devices. In addition, the screen provides a continuously updated snapshot of system performance.



```
Uptime: 0 DAYS  00:14:56          SYSTEM STATISTICS              01-SEP-1993  12:30:38
                                     Version L1X9

                                                  Device Table                    LUN / I
                              ---CI-------------------- PORT 0 ---- PORT 1 ---- PORT 2 --D
Cache hit:        100 %      | ID HOST    | ID HOST  | 01234567  | 01234567  | 01234567 |
Req/Sec:         1300        |            |          | 0 O       | 0 O       | 0 O      |
Cache Size:       8 MB       | 0  WHITE   | 16       | 1 A       | 1 A       | 1 A      |
                             | 1 *HAWK    | 17       | 2 F       | 2 F       | 2 F      |
                             | 2  RED     | 18       | 3 C       | 3 C       | 3 C      |
        Free Lists           | 3          | 19       | 4         | 4         | 4        |
 ------------------------    | 4          | 20       | 5         | 5         | 5        |
| DB        USED/TTL     |   | 5          | 21       | 6         | 6         | 6        |
|------------------------|   | 6          | 22       | 7 ********| 7 ********| 7 *******|
| CDRP      8/1024       |   | 7          | 23       |-- PORT 3 ---- PORT 4 ---- PORT 5 --|
| SCDRP     1/1024       |   | 8          | 24       | 01234567  | 01234567  |   DSSI   |
| CDT       6/128        |   | 9          | 25       | 0 O       | 0 O       | 0 *HAWK  |
| UCB       11/384       |   | 10         | 26       | 1 A       | 1 A       | 1        |
| PB        3/32         |   | 11         | 27       | 2 F       | 2 F       | 2        |
| SUCB      11/384       |   | 12         | 28       | 3 C       | 3 C       | 3        |
| TQE       13/100       |   | 13         | 29       | 4         | 4         | 4        |
| EMPSG     2/107        |   | 14         | 30       | 5         | 5         | 5        |
| CAT       0/0          |   | 15         | 31       | 6         | 6         | 6        |
| SGTORD    0/7          |   |            |          | 7 ********| 7 ********| 7  BLUE  |
| CBFRE                  |    ------------------------------------------------------------
| SGWRLH                 |
 ------------------------
```

The preceding screen simulation shows a typical System Statistics display for a cluster with two hosts (nodenames White and Red) connected to a CSV-8100 on the CI; one host (nodename Blue) connected to port 5 of the CSV-8100 by DSSI; and three devices connected to each SCSI bus on ports 0 through 4. Hawk is the nodename of the CSV-8100.

The CI section shows that White has been assigned a CI node ID of 0. Red's node ID is 2. The node ID of the CSV-8100 (Hawk) is 1 (see page 2-2 for information about setting the Hawk's CI node ID).

Each port section is in the form of an array. When the Hawk detects a device on a bus, it displays a code representing the status of the device (see the following table for code definitions). The position of the code indicates the SCSI ID and LUN of the device. The vertical axis of the array represents the SCSI ID, and the horizontal axis represents the LUN. In the simulated screen show above, each SCSI port has an "online" device on ID 0, LUN 0, an "available" device on ID 1, LUN 0, and an "offline" device on ID2, LUN 0.

■ **Table 4-1 Device Table Port Codes**

Code	Meaning	Explanation
O	Online	The device is working properly and has been mounted or initialized.
A	Available	The device is working properly but has not yet been mounted or initialized.
C	Cached	Data from the device is cached, using the Hawk's on-board cache.
F	Offline	The device has been detected on the bus but for some reason (e.g. not spun up) is not available for mounting or initializing.
M	Maintenance	The device has been selected for maintenance through the Diagnostics Utility Protocol (DUP) and is not available for I/O operations with the host.
*******	Initiator ID	The SCSI ID of the Hawk is represented by asterisks.

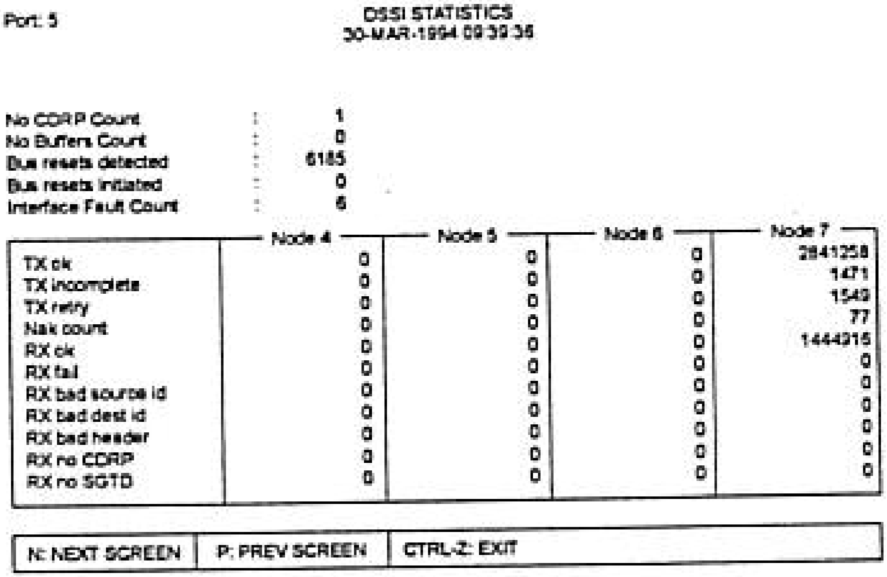
In the simulated System Statistics screen shown above, port 5 is dedicated to DSSI. The display for port 5, therefore, shows which systems or devices (identified by nodename) are assigned to the eight possible DSSI nodes.

The top, left corner of the screen contains information about the performance of the Hawk. The "cache hit" value indicates the percentage of read requests that have been satisfied from the Hawk's cache rather than from slower device accesses. The "Req/Sec" (requests per second) value gauges the rate at which the Hawk is handling I/O requests. "Cache Size" indicates how many megabytes of cache memory are installed on the board.

The "Free Lists" section shows how the Hawk's buffers are allocated and used. This information is intended for use by CMD technical support personnel as a troubleshooting tool. You may be asked to provide this information when you call CMD for technical support.

DSSI Statistics

This screen is intended as a tool for troubleshooting DSSI problems—particularly cabling and termination issues—on the CSV-8100. Although the information on this screen is technical and designed primarily for service personnel, you may be able to use the screen to identify potential problems with your DSSI interface.



```
Port: 5                               DSSI STATISTICS
                                  30-MAR-1994 09:39:36


No CDRP Count              :         1
No Buffers Count           :         0
Bus resets detected        :      6185
Bus resets initiated       :         0
Interface Fault Count      :         6
---------------------------- Node 4 ------- Node 5 ------- Node 6 ------- Node 7 --
| TX ok                  |          0 |          0 |          0 |      2841258 |
| TX incomplete          |          0 |          0 |          0 |         1471 |
| TX retry               |          0 |          0 |          0 |         1549 |
| Nak count              |          0 |          0 |          0 |           77 |
| RX ok                  |          0 |          0 |          0 |      1444916 |
| RX fail                |          0 |          0 |          0 |            0 |
| RX bad source id       |          0 |          0 |          0 |            0 |
| RX bad dest id         |          0 |          0 |          0 |            0 |
| RX bad header          |          0 |          0 |          0 |            0 |
| RX no CDRP             |          0 |          0 |          0 |            0 |
| RX no SGTD             |          0 |          0 |          0 |            0 |
-----------------------------------------------------------------------------------

| N: NEXT SCREEN | P: PREV SCREEN | CTRL-Z: EXIT                                  |
```

If you notice abnormal values on the DSSI Statistics screen, try the following steps before calling technical support

- ☐ Check the DSSI cable for defects, such as a bad wire or a bad solder connection. If possible try swapping the cable with another cable that you believe to be in good condition.
- ☐ Check the termination on the DSSI bus. The bus should be terminated at both ends. If the Hawk is at one end of the bus, make sure the DSSI terminator resistor packs are installed properly and the appropriate jumpers are set.

The CSV-8100 supports up to two DSSI ports, so there can be as many as two sets of DSSI statistics, one for each port configured for DSSI. Each set of DSSI statistics contains two pages. The first page shows statistics for nodes 0 through 3 and the second page shows statistics for nodes 4 through 7. Use the N and P keys on the monitor keyboard to navigate among the screens. Press Ctrl-Z to exit the DSSI Statistics screen and C to reset all counters to zero.

Press "C" on your monitor keyboard to clear the DSSI Statistics screen and reset all counters to zero.

The following fields are displayed on the DSSI Statistics screen

No CDRP Count: CDRP, which stands for Class Driver Request Packet, is a buffer the Hawk uses to store packet header information. The number displayed in this field is a tally of the instances when the DSSI driver needed a CDRP but no CDRP was available. This number will equal the total of the "RX no CDRP" fields for all nodes.

No Buffers Count: The buffers referenced in this field are used by the Hawk to store the data portion of a packet. This value will increment each time the DSSI driver attempted to perform a write but could not perform the operation due to a lack of buffer space.

Bus Resets Detected: This field increments each time the Hawk detects a DSSI bus reset. Occasional resets are normal on DSSI. However, if you see this counter incrementing at a rapid rate (e.g. once a second or more) you probably have a cabling problem.

Bus Resets Initiated: This field displays the number of times the Hawk initiated a bus reset on the DSSI. The Hawk will initiate a bus reset when it detects a parity error. A high number of bus resets initiated could indicate a cable or interface problem.

Interface Fault Count: This field counts the number of times a fault occurs in the DSSI interface chip. Such faults usually occur as a result of a physical cable break in a DSSI connection.

TX ok: The number of packets transmitted successfully.

TX incomplete: The number of packet transmissions that were attempted but failed because the host went bus free before the entire packet could be sent. A high number of TX incompletes could indicate a cabling problem.

TX retry: A count of the number of transmissions retried after an initial failure.

Nak count: The number of negative acknowledgments (Naks) received from the host. A host will issue a Nak when it has no buffer space to receive a packet from a node.

RX ok: The number of packets received successfully from a host.

RX fail: The number of failed transmissions that hosts attempted to send to the Hawk. A failed transmission is usually caused by a bad cable.

RX bad source id: The number of packets rejected by the Hawk due to a problem with the source ID in the header.

RX bad dest id: The number of packets rejected by the Hawk due to a problem with the destination ID in the header.

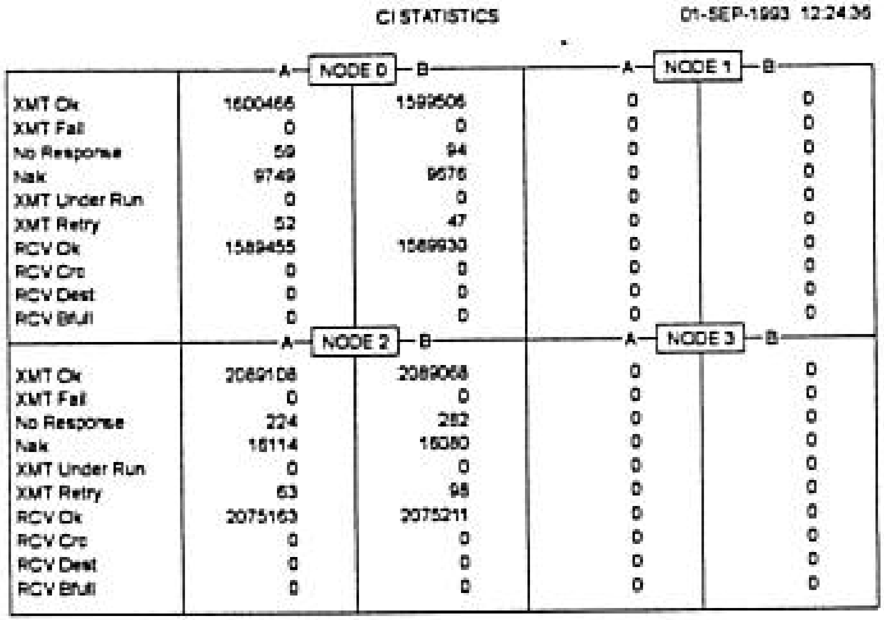
RX bad header: The number of packets rejected by the Hawk due to a packet header problem other than a bad source or destination ID.

RX no CDRP: The number of packets rejected by the Hawk due to a lack of CDRP buffer space for the packet header. The "RX no CDRP" field reports the same type of problem as the "No CDRP Count" field at the top of the screen, except it reports the total for a single node rather than an aggregate for all nodes.

RX no SGTD: The number of packets rejected by the Hawk due to a lack of SGTD (Scatter-Gather Table Descriptor) buffer space for the packet data. The "RX no SGTD" field reports the same type of problem as the "No Buffers Count" field at the top of the screen, except it reports the total for a single node rather than an aggregate for all nodes.

CI Statistics

CI Statistics is another useful screen that provides information about how efficiently the Hawk is communicating with the other CI nodes. With this information, you can diagnose such problems as defective CI cables and improper slot count or node count settings, which can result in packet collisions.



```
                                CI STATISTICS                        01-SEP-1993 12:24:36

                         A-[NODE 0]-B                        A-[NODE 1]-B
XMT Ok                1600466        1599506                 0              0
XMT Fail                    0              0                 0              0
No Response                59             94                 0              0
Nak                      9749           9676                 0              0
XMT Under Run               0              0                 0              0
XMT Retry                  52             47                 0              0
RCV Ok                1589455        1589930                 0              0
RCV Crc                     0              0                 0              0
RCV Dest                    0              0                 0              0
RCV Bfull                   0              0                 0              0
                         A-[NODE 2]-B                        A-[NODE 3]-B
XMT Ok                2069108        2069068                 0              0
XMT Fail                    0              0                 0              0
No Response               224            282                 0              0
Nak                     16114          16080                 0              0
XMT Under Run               0              0                 0              0
XMT Retry                  63             98                 0              0
RCV Ok                2075163        2075211                 0              0
RCV Crc                     0              0                 0              0
RCV Dest                    0              0                 0              0
RCV Bfull                   0              0                 0              0
```

This screen gives a tally of activity for each CI path since the Hawk was last booted or manually cleared by pressing "C" on the monitor keyboard. Each counter will go as high as 2 to the 32nd power (about 4.29 billion) before restarting at zero.

Press "C" on your monitor keyboard to clear the CI Statistics screen and reset all counters to zero.

There are eight pages of CI Statistics screens. (Each screen displays four nodes, and 32 is the maximum number of nodes a star cluster can handle.) Each page displays statistics for four nodes. Use the page up and page down keys on your keyboard to move from page to page.

The statistics are from the Hawk's point of view. In other words, only packets transmitted or received by the Hawk are included in the statistics. Since the Hawk cannot transmit packets to or receive packets from itself, the section for the Hawk's node number will show all zeros.

XMT Ok: (Transmit OK) This is the number of packets successfully transmitted by the Hawk to a particular node on the specified path.

XMT Fail: (Transmit Fail) This is the number of packets that the Hawk tried and failed to transmit due to a problem with the selected path. Each time the Hawk tries to transmit a packet and receives either a no response or a Nak, it increments either the No Response or Nak counter by one and attempts the transmission again. Once either of these counters reaches 15, the Hawk increments its XMT Retry counter by one, resets its No Response and NAK counters to zero, and begins another cycle of retransmissions. When the XMT Retry counter reaches eight, the Hawk will divert the current transmission and all subsequent transmissions to the alternate path (if it is open). The Hawk will continue to divert traffic to the other path until it receives a polling request from a host on the closed path. This indicates that the closed path has been repaired and can handle transmissions again.

No Response: No responses are normal occurrences in CI. They occur when a transmission elicits no response whatsoever from the intended target. This could occur as a result of a CRC (Cyclic Redundancy Check) error due to a collision on the interconnect or a faulty cable. Some no responses are normal, but if this number grows to significant proportions, you probably have a defective CI cable that should be replaced.

Nak: (Negative Acknowledgment) If the Hawk attempts to transmit a packet to a target node and the target is not ready to accept it, the target will send back a Nak signal.

XMT Under Run: This refers to internal errors in the Hawk and is intended as a troubleshooting tool for CMD Technical Support personnel.

XMT Retry: See the XMT Fail description above for a full explanation of the Hawk's packet transmission cycle. The XMT Retry total gives a tally of the number of instances the Hawk has attempted to retransmit a packet after receiving either 15 No Responses or 15 Naks.

RCV Ok: (Receive OK) This is the count of packets received successfully by the Hawk from the particular node on the specified path.

RCV Crc: (Receive Cyclic Redundancy Check) A count of packets received by the Hawk that contained CRC errors and were therefore rejected as unusable. A CRC error is usually due to a collision on the CI (when one node sends a packet before another node is finished sending a packet). The possibility for collisions increases as the traffic on the CI increases. A small number of CRC errors is normal, but if the number grows to be disproportionately high, you should verify that the slot count and node count values for the Hawk and all CI adapters in the cluster are set properly.

RCV Dest: (Receive Destination) This is the count of packets received by the Hawk but which contained a mismatch between the destination node number and the complement of the destination node number. (All CI packets contain the node ID of the destination node as well as a back up copy of the destination node ID—known as the destination complement. The target node compares the destination ID and the destination complement. If there is a mismatch, it presumes the packet was corrupted in transit and rejects it.) A disproportionate number of RCV Dest occurrences is an indication that too many collisions are taking place on the CI, due to improper slot count or node count settings.

RCV Bfull: (Receive Buffer Full)—This is an internal error generated by the Hawk and is intended as a troubleshooting tool for CMD Technical Support personnel.

System Processes

This screen is intended as a troubleshooting tool for CMD Technical Support personnel. You may be asked to convey information from this screen if you call for assistance.

Circuit Information

This screen is intended as a troubleshooting tool for CMD Technical Support personnel. You may be asked to convey information from this screen if you call for assistance.

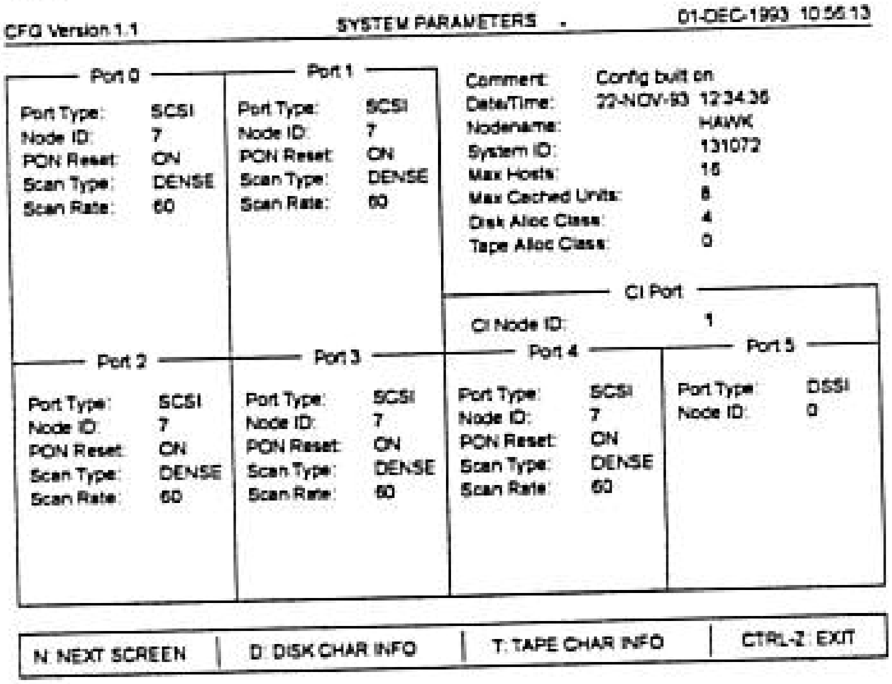
Connection Information

This screen is intended as a troubleshooting tool for CMD Technical Support personnel. You may be asked to convey information from this screen if you call for assistance.

System Parameters

This menu option takes you to a succession of read-only screens that display the current parameters for the every port and device. If you wish to change any of these values, you must edit the configuration file on the bootup floppy diskette (see "Editing the Configuration File" on page 3-6 for detailed instructions).

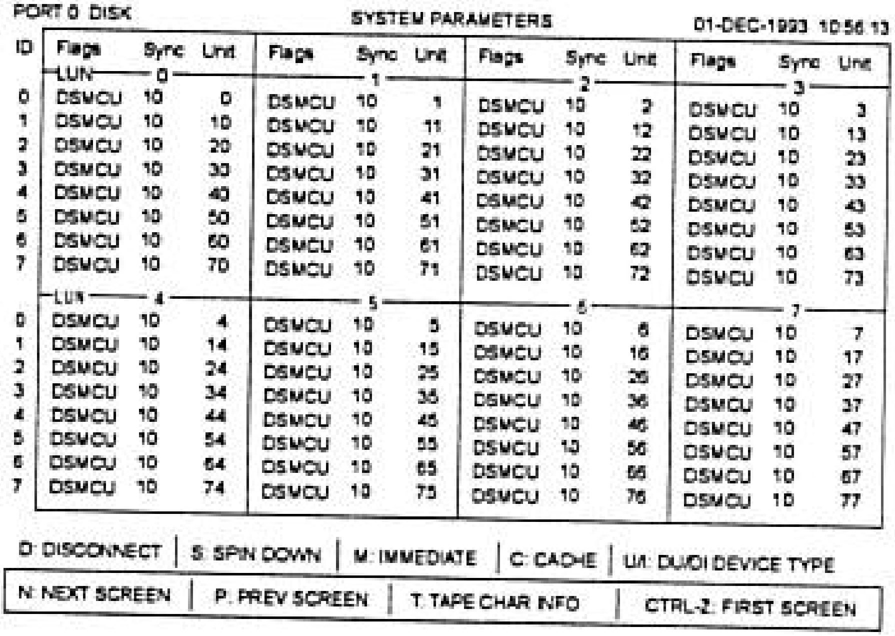
The first screen that appears shows the current values for all the global system parameters, as well as other information extracted from the configuration file on the bootup floppy diskette. All identifying information, such as "Nodename," "System ID," SCSI and DSSI node IDs apply to the Hawk.



```
CFG Version 1.1                  SYSTEM PARAMETERS              01-DEC-1993 10:56:13

------ Port 0 ----------------- Port 1 ------   Comment:        Config built on
Port Type:    SCSI    Port Type:    SCSI        Date/Time:      22-NOV-93 12:34:36
Node ID:      7       Node ID:      7           Nodename:                 HAWK
PON Reset:    ON      PON Reset:    ON          System ID:                131072
Scan Type:    DENSE   Scan Type:    DENSE       Max Hosts:                16
Scan Rate:    60      Scan Rate:    60          Max Cached Units:         8
                                                Disk Alloc Class:         4
                                                Tape Alloc Class:         0

                                              ------------ CI Port ------------
                                                CI Node ID:               1
------ Port 2 ----------------- Port 3 ------------- Port 4 ----------- Port 5 ----
Port Type:    SCSI    Port Type:    SCSI    Port Type:    SCSI    Port Type:   DSSI
Node ID:      7       Node ID:      7       Node ID:      7       Node ID:     0
PON Reset:    ON      PON Reset:    ON      PON Reset:    ON
Scan Type:    DENSE   Scan Type:    DENSE   Scan Type:    DENSE
Scan Rate:    60      Scan Rate:    60      Scan Rate:    60

N: NEXT SCREEN  |  D: DISK CHAR INFO  |  T: TAPE CHAR INFO  |  CTRL-Z: EXIT
```

Disk Device Parameters

The additional screens in the Systems Parameters menu option give a port-by-port listing of the local parameters for each ID and LUN. There are six screens for the disk devices on ports 0 through 5, and another six screens for the tape devices on ports 0 through 5. You may cycle through all the screens by pressing "N" or jump to either the disk or tape screens by pressing the "D" or "T" key. A typical disk screen might look like the following example.



```
PORT 0  DISK                    SYSTEM PARAMETERS                       01-DEC-1993  10:56:13
ID | Flags   Sync  Unit | Flags   Sync  Unit | Flags   Sync  Unit | Flags   Sync  Unit |
   |-LUN------0---------|---------1----------|---------2----------|---------3----------|
0  | DSMCU   10      0  | DSMCU   10      1  | DSMCU   10      2  | DSMCU   10      3  |
1  | DSMCU   10     10  | DSMCU   10     11  | DSMCU   10     12  | DSMCU   10     13  |
2  | DSMCU   10     20  | DSMCU   10     21  | DSMCU   10     22  | DSMCU   10     23  |
3  | DSMCU   10     30  | DSMCU   10     31  | DSMCU   10     32  | DSMCU   10     33  |
4  | DSMCU   10     40  | DSMCU   10     41  | DSMCU   10     42  | DSMCU   10     43  |
5  | DSMCU   10     50  | DSMCU   10     51  | DSMCU   10     52  | DSMCU   10     53  |
6  | DSMCU   10     60  | DSMCU   10     61  | DSMCU   10     62  | DSMCU   10     63  |
7  | DSMCU   10     70  | DSMCU   10     71  | DSMCU   10     72  | DSMCU   10     73  |
   |-LUN------4---------|---------5----------|---------6----------|---------7----------|
0  | DSMCU   10      4  | DSMCU   10      5  | DSMCU   10      6  | DSMCU   10      7  |
1  | DSMCU   10     14  | DSMCU   10     15  | DSMCU   10     16  | DSMCU   10     17  |
2  | DSMCU   10     24  | DSMCU   10     25  | DSMCU   10     26  | DSMCU   10     27  |
3  | DSMCU   10     34  | DSMCU   10     35  | DSMCU   10     36  | DSMCU   10     37  |
4  | DSMCU   10     44  | DSMCU   10     45  | DSMCU   10     46  | DSMCU   10     47  |
5  | DSMCU   10     54  | DSMCU   10     55  | DSMCU   10     56  | DSMCU   10     57  |
6  | DSMCU   10     64  | DSMCU   10     65  | DSMCU   10     66  | DSMCU   10     67  |
7  | DSMCU   10     74  | DSMCU   10     75  | DSMCU   10     76  | DSMCU   10     77  |

D: DISCONNECT | S: SPIN DOWN | M: IMMEDIATE | C: CACHE | U/I: DU/DI DEVICE TYPE
| N: NEXT SCREEN | P: PREV SCREEN | T: TAPE CHAR INFO | CTRL-Z: FIRST SCREEN |
```

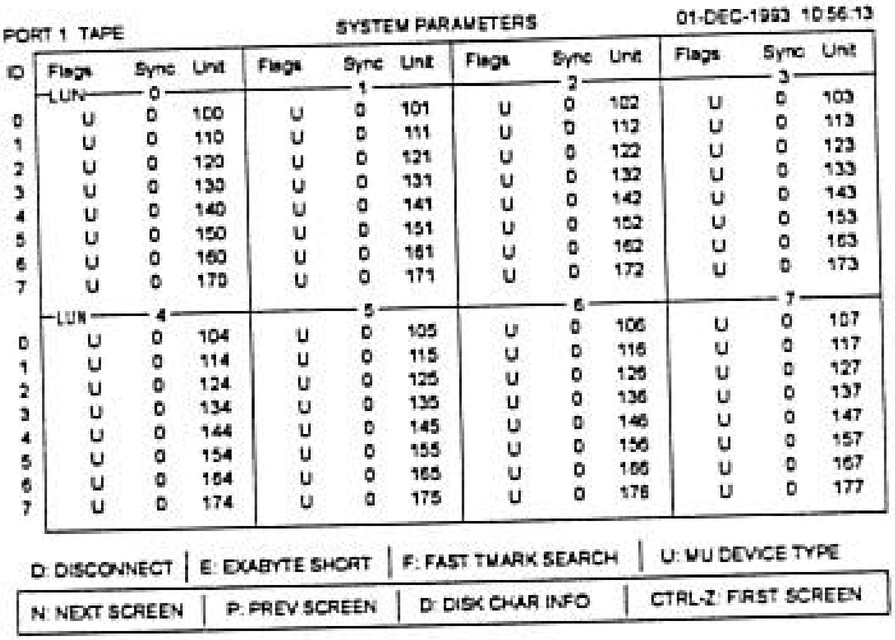
This screen shows the disk parameters for every possible ID and LUN on Port 0. The four boxes on the top row represent LUNs 0 through 3, from left to right. The bottom four boxes represent LUNs 4 through 7. Each row of values represents a SCSI ID, starting with ID 0 in the first row. The "Flags" column indicates how the disconnect (D), spndwn (S), immed (M), cache (C) and device_type (U/I) parameters are set. A legend for the Flags column is at the bottom of the screen. The "Sync" column corresponds to the sync_rate parameter which sets the maximum sync rate (in megabytes per second) for each ID and LUN. The third column in each box shows the MSCP unit number (determined by the disk_name_algorithm parameter) assigned to that ID and LUN. (Please see page 3-8 for an explanation of these parameters.)

In the sample screen shown above, all the IDs and LUNs are set to their default disk parameter values. For instance, a disk device on SCSI ID 5, LUN 0 of Port 0 will have a MSCP unit number of 50. The device has a maximum sync rate of 10. The device_type parameter is set to DU, and the disconnect, spndwn, immed and cache parameters are all enabled. If any of these values had been overridden in the configuration file, the appropriate values would show up on the display.

To view the parameter values for the next port, press the "N" key. You may reverse direction and view the previous screen at any time by pressing the "P" key. If you wish to jump directly to the first tape devices screen, press the "T" key.

Tape Devices Screen

The System Parameters screen for tape devices is similar to the disk devices screen, except that parameters unique to tapes are substituted for the spndwn, immed and cache parameters for disk devices. A typical screen might look as follows.



```
PORT 1  TAPE                   SYSTEM PARAMETERS               01-DEC-1993  10:56:13
ID | Flags   Sync  Unit | Flags   Sync  Unit | Flags   Sync  Unit | Flags   Sync  Unit
   +-LUN------0---------------------1--------------------2--------------------3------
0  |   U      0    100  |   U      0    101  |   U      0    102  |   U      0    103
1  |   U      0    110  |   U      0    111  |   U      0    112  |   U      0    113
2  |   U      0    120  |   U      0    121  |   U      0    122  |   U      0    123
3  |   U      0    130  |   U      0    131  |   U      0    132  |   U      0    133
4  |   U      0    140  |   U      0    141  |   U      0    142  |   U      0    143
5  |   U      0    150  |   U      0    151  |   U      0    152  |   U      0    153
6  |   U      0    160  |   U      0    161  |   U      0    162  |   U      0    163
7  |   U      0    170  |   U      0    171  |   U      0    172  |   U      0    173
   +-LUN------4---------------------5--------------------6--------------------7------
0  |   U      0    104  |   U      0    105  |   U      0    106  |   U      0    107
1  |   U      0    114  |   U      0    115  |   U      0    116  |   U      0    117
2  |   U      0    124  |   U      0    125  |   U      0    126  |   U      0    127
3  |   U      0    134  |   U      0    135  |   U      0    136  |   U      0    137
4  |   U      0    144  |   U      0    145  |   U      0    146  |   U      0    147
5  |   U      0    154  |   U      0    155  |   U      0    156  |   U      0    157
6  |   U      0    164  |   U      0    165  |   U      0    166  |   U      0    167
7  |   U      0    174  |   U      0    175  |   U      0    176  |   U      0    177

 D: DISCONNECT | E: EXABYTE SHORT | F: FAST TMARK SEARCH | U: MU DEVICE TYPE
 N: NEXT SCREEN | P: PREV SCREEN | D: DISK CHAR INFO | CTRL-Z: FIRST SCREEN
```

Like the disk devices screen, the parameter values for each LUN are displayed in boxes, from LUN 0 in the top, left box to LUN 7 in the bottom, right box. SCSI IDs are listed from 0 at the top of each box to 7 at the bottom. The first column in each LUN box lists the values for the disconnect (D), exabyte_short_tmark (E), fast_tape_mark_search (F) and device_type (U/I) parameters. The second column shows the value of the sync_rate parameter for each ID and LUN. The third column shows the MSCP unit number dictated by the tape_name_algorithm parameter or by an override statement. A legend for the "flags" column appears at the bottom of the screen.

Chapter 5

Front Panel Display

The front panel display provides a constantly updated glimpse at the devices connected to the Hawk. The buttons under the display currently are not functional. They will be brought into play as future firmware upgrades enhance the capabilities of the front panel display.

Device Display

During normal operation, the front panel display cycles through all the devices connected to the Hawk in a continuous loop. When information about the last device is flashed on the screen, the display returns to the first device and begins the cycle all over again.

For each device, the display shows two screens of information. The top line on both screens identifies the physical device name of the subject SCSI device and the nodename of the Hawk. The difference between the two screens is apparent on the second line, which identifies the device manufacturer, model number and revision number on the first screen and the SCSI ID, logical unit number (LUN), device status and write protection status on the second screen.

The first screen will look something like the following example.

```
$4$DUA1010    (HAWK)
ID=1 LUN=0 ONLNE R/W
```

The second line on this screen begins on the left with the SCSI ID of the device, followed by the LUN. Next comes the device status, and the last entry indicates whether the device is enabled for read/write access for for read-only access.

The second screen for the same device might look like this.

```
$4$DUA1010    (HAWK)
FUJITSU M2694ES 386E
```

The left side of the top line identifies the physical device name of the particular device. On the right side of the top line is parenthesis is the nodename of the Hawk. The second line displays the device manufacturer's name, the device model number and the revision number of the device's firmware.

Chapter 6

DUP Programs

Accessing DUP

There are two ways to access the Hawk's diagnostics utility protocol (DUP) programs:

- ☐ From the OpenVMS prompt
- ☐ From a monitor connected to the Hawk's serial interface

This chapter contains instructions on how to access DUP programs via these two methods. For information about the PARAMS and UTILIT programs themselves see chapters 7 and 8.

OpenVMS Prompt

Follow these steps to connect to DUP from the OpenVMS Prompt...

1. If you are working on a terminal connected to a VAX system, issue the following command to connect to the DUP server:

```
$ MC SYSGEN CONNECT DUP_server/NOADAPTER
```

Replace the variable *DUP_server* with the name of the DUP server on your system. This is typically "FYA0."

2. If you are working on a terminal connected to an AXP system, issue the following command to connect to the DUP server:

```
$ MC SYSMAN IO CONNECT DUP_server/NOADAPTER/DRIVER=SYS$FDRIVER
```

Replace the variable *DUP_server* with the name of the DUP server on your system. This is typically "FYA0."

3. Once you have connected to the system DUP server, you can access the Hawk's DUP programs by issuing the following command:

```
$ SET HOST/DUP/TASK=taskname/SERVER=MSCP$DUP n
```

Replace the variable *taskname* with either "PARAMS" or "UTILIT," depending on which program you want to enter. You may also omit the TASK=*taskname* parameter, in which case you will be prompted to enter a task name. Replace the variable *n* at the end of the command line with the nodename of the Hawk.

See chapter 7 for a description of the PARAMS program and chapter 8 for a description of the UTILIT program.

Serial Interface

This section assumes that you have already established a connection with the Hawk's serial interface. If you have not, see chapter 4 for instructions.

Follow these steps to connect to DUP from the serial interface...

1. Select "DUP Programs" from the main menu.
2. At the "Task Name?" prompt, enter the DUP program you want to enter—either PARAMS or UTILIT.

See chapter 7 for a description of the PARAMS program and chapter 8 for a description of the UTILIT program.

Chapter 7

PARAMS

Overview

While most of the Hawk's operational parameters must be modified in the configuration file (see page 3-6), the PARAMS task in the Hawk's diagnostics utility protocol (DUP) does have the capability to modify a limited number of parameters. You can also use PARAMS to show a listing of all parameter settings or a subset consisting of just system, port or device parameter settings. Finally, PARAMS features a RESTART command, which you can use to force the Hawk to reboot and reinitialize its parameters.

This chapter assumes that you have connected to the DUP server and selected the PARAMS program. If you have not already done this, see chapter 6 for instructions.

PARAMS Commands

The following commands are available in PARAMS...

HELP

Enter this command to view a brief summary of PARAMS commands and their proper syntax.

SET DEVICE

You may use the PARAMS program to set the following parameters:

- ☐ ONEB (online enable), which controls whether a particular device is online or offline with respect to the host.

The Hawk does not cache tape devices.

- ☐ CACH (cache), which controls whether the Hawk stores data read from a device in its read cache.
- ☐ WPRT (write protect), which controls whether or not a device is write protected.

If you use PARAMS to change a device's CACH parameter and wish to make this change permanent, you must also change that device's cache parameter in the configuration file by inserting an override statement.

All other device parameters must be set in the configuration file on the bootup floppy diskette (see page 3-6. Any parameter changes made in PARAMS do not get transferred to the configuration file. This becomes an issue with the CACH parameter, which is the only DUP-configurable device parameter with a counterpart in the configuration file. If you use PARAMS to change the CACH parameter for a device and wish to make this setting permanent, you must override the cache parameter for that device in the configuration file. Otherwise, the old setting in the configuration file will become operational the next time you reboot the Hawk. Changes made to ONEB and WPRT, which have no counterparts in the configuration file, will not be affected when the Hawk is rebooted.

When you use SET DEVICE to change the ONEB, CACH and WPRT parameters, your changes will take affect immediately. There is no need to reboot the Hawk.

A full description of all device parameters, including ONEB, CACH and WPRT, begins on page 7-5.

The syntax of the SET DEVICE command is as follows:

```
SET DEVICE <p> <i>parameter-<value> [...]
```

...where <p> is the port number, <i> is the SCSI ID of the device, parameter is the keyword of the parameter you wish to change, and <value> is the new value for the parameter. [...] indicates that more than one command may be entered on a single line. You may use an asterisk (*) in place of <p> and/or <i> if you wish to change the same parameter for all ports and/or all SCSI IDs.

The SET DEVICE command applies to all LUNs associated with a SCSI ID. For example, if you set CACH off for port 3, ID 4, you will turn off caching for LUNs 0 through 7 of ID 4. This contrasts with the configuration file, which permits you to set a parameter for a particular LUN, while leaving the other LUNs of the same ID untouched.

The following are examples of the SET DEVICE command...

```
SET DEVICE 1 2 ONEB-OFF

SET DEVICE 2 4 WPRT-ON CACH-ON

SET DEVICE * * CACH-OFF

SET DEVICE 3 * ONEB-ON WPRT-OFF
```

SHOW ALL

Issue this command to view a listing of all SYSTEM, PORT and DEVICE parameters.

SHOW DEVICE

This command displays a listing of all DEVICE parameters for every port and SCSI ID.

SHOW SYSTEM

This command displays a listing of all SYSTEM parameters.

RESTART

The RESTART command forces a reboot of the Hawk, which reinitializes all operational parameters, except ONEB and WPRT, to the settings specified in the configuration file. The ONEB and WPRT parameters can be set with the SET DEVICE command only and will retain their values during a reboot.

The RESTART command takes no arguments. To issue the command, type RESTART by itself on the command line.

QUIT

Exit a DUP PARAMS session with the QUIT command. This will take you back to the DUP directory. Exit DUP altogether by pressing Ctrl-C or the BREAK key. If you are accessing DUP through the Hawk's serial interface, press Ctrl-Z to return to the main menu.

Parameter Descriptions

The remainder of this chapter lists and describes the system, port and device parameters found in PARAMS.

System Parameters

System parameters configure the Hawk for a particular operating environment. The six system parameters recognized by the Hawk are listed below. Factory default settings are indicated with bold face type.

■ **Table 7-1 System Parameters**

Parameter	Valid Entries
SYSTEM_ID	1 to 268435456 (131072)
NODENAME	≤8 characters (131072)
DISK_ALCS	0 to 255 (4)
TAPE_ALCS	0 to 255 (4)
MAX_HOSTS	1 to 32
MAX_CACHED_UNITS	0 to 255 (8)

Descriptions

SYSTEM_ID: Specifies the lower-order 32 bits of the 48-bit system identification number. Each node in the system must have a unique system ID. The higher order 16 bits are reserved by Digital Equipment Corp. for future use.

NODENAME: Sets the DSSI node name of the Hawk. The name must be unique among all nodes in the system. You may enter a name that is up to eight characters long, but VMS will recognize only the first six characters. The node name may contain any alphanumeric character except the dollar sign ($) or the underscore (_) character.

DISK_ALCS: Determines the device allocation class for all disk devices connected to the Hawk. If you wish to have the disks served to other nodes in the system, this parameter must be greater than zero and match the ALLOCLASS SYSGEN parameter on all connected systems.

TAPE_ALCS: Determines the device allocation class for all tape devices connected to the Hawk. If you wish to have the tape devices served to other nodes in the system, this parameter must be greater than zero and match the ALLOCLASS SYSGEN parameter on all connected systems.

MAX_HOSTS: Specifies the maximum number of hosts with which the Hawk will communicate. For best results, set this to the number of hosts in your system.

MAX_CACHED_UNITS: Specifies the maximum number of disk devices to be cached. You should set this parameter to the largest number of devices you expect to cache. This permits the Hawk to configure itself for maximum cache efficiency.

Port Parameters

Port parameters govern the Hawk's SCSI and DSSI ports. The four system parameters recognized by the Hawk are listed below. Factory default settings are indicated with bold face type.

■ Table 7-2 Port Parameters

Parameter	**Valid Entries**
SCSI_ID	0 to 7
DSSI_ID	0 to 7
SCANNING	Dense, **Sparse**, None
SCAN_RATE	0 to 255 seconds **(60)**
POWER_ON_RESET	On | **Off**

Descriptions

SCSI_ID: This parameter shows the SCSI ID of a particular Hawk port. To change the SCSI ID for a port, you must manipulate the appropriate jumpers on the board.

DSSI_ID: This parameter shows the DSSI node ID of a particular Hawk port. To change the DSSI node ID for a port, you must manipulate the appropriate jumpers on the board.

SCANNING: When set to "dense" or "sparse," this parameter will cause the Hawk to periodically scan all SCSI buses for new devices. Use "dense" when your devices are packed on each SCSI bus, with no vacant addresses between devices installed on the same bus. A "dense" scan will begin at SCSI ID 7, logical unit number (LUN) 0 and progress through each LUN until it finds a vacant address, at which point it begins searching LUN 0 of the next smaller ID. "Dense" scanning will not find a device if there is a vacant LUN between it and the preceding device on the same bus. Use "sparse" when your devices are scattered on the bus, with vacant addresses among them. A "sparse" scan will search every ID and LUN on each bus. The scanning frequency is determined by the *scan_rate* parameter. When scanning is set to "none," the Hawk will perform a single scan on each SCSI bus when power is turned on.

SCAN_RATE: When the scanning parameter is set to "sparse" or "dense", *scan_rate* determines how frequently (in seconds) scans take place.

POWER_ON_RESET: This parameter enables or disables the issuance of a SCSI bus RESET on power-up.

Device Parameters

Device parameters control how the Hawk treats each device connected to it. The 13 system parameters recognized by the Hawk are listed below. Only the ONEB, CACH and WPRT parameters may be modified with the SET DEVICE command. All parameters may be viewed with the SHOW DEVICE command. Factory default settings are indicated with bold face type.

■ Table 7-3 Device Parameters

Parameter	**Valid Entries**
Type	DU | DI (disk); MU (tape)
Unit	0 to 9999
Oneb	**On** | Off
Wprt	On | **Off**
Sync	0 to **10** MB/sec
Cach	**On** | Off
Disc	**On** | Off
TagQ	**On** | Off
Spin	**On** | Off
Immd	**On** | Off
Shtm	On | **Off**
Ftms	On | **Off**
Tmc	**On** | Off

Descriptions

Type: This parameter determines the default device type for disk and tape devices controlled by the Hawk. For disk devices, you have two choices: DU, the standard disk type for UDA disks, or DI, the disk type for DSSI disks. Neither device type carries any advantage over the other in terms of performance or serving ability.

Unit: This parameter permits you to specify a unit number for any particular device. The unit number is a component of the physical device name that VMS uses to address storage devices. By default, the Hawk assigns device numbers according to the following formula: (100*port) + (10*id). If you change the default unit number for a device, be sure that it does not conflict with another unit number.

Oneb: The *Oneb* (online enable) parameter makes a device online with respect to the host when set to "on" and offline when set to "off." Set this parameter to "off" when you want to block the transmission of commands from the host to a particular device. For normal operation, set *Oneb* to "on."

Wprt: *Wprt* enables or disables write protection on a device. Set *Wprt* to "on" to enable write protection and prevent a host from writing to a device. Set the parameter to "off" to disable write protection.

Sync: This parameter sets the maximum rate (in megabytes per second) at which the Hawk will attempt to transfer data in synchronous mode. If the Hawk cannot negotiate the maximum rate with the device, it will work its way down until it can agree on a lower rate. *Sync* must be a whole number between zero and 10. A sync rate of zero forces the Hawk to communicate with the device in asynchronous mode.

Cach: Use this parameter to set caching on or off for a device. When you set *Cach* "off" for a device, the Hawk will not cache data from that device. Turn *Cach* "on" when you want to store data from a device in the Hawk's read cache.

Disc: Set this parameter to "on" to enable disconnect for a device. Disconnect is a feature of SCSI that enables a target device to temporarily disconnect from the bus while it processes a command. When it completes its work, the device reconnects to the bus to transmit a response to the initiator. Disconnect can enhance performance by allowing other devices to access the bus while a device is performing lengthy operations, such as a tape rewinds or disk seeks. If you have only one device on a bus, you will get better performance by *disabling* disconnect (set *disc* to "off").

TagQ: This parameter enables or disables tag queuing. Tag queuing permits each initiator to issue commands with instructions for how the target should handle the command. An initiator can specify whether each command should be executed by the target at the first opportunity, in the order in which it was received, or at a time deemed appropriate by the target. Tag queuing permits each initiator to have multiple commands outstanding and each target to optimize the commands it receives.

Spin: Use this parameter to enable or disable spin down. When set to "on," the Hawk will spin down drives or eject media when the operating system issues a spin down command such as the VMS DISMOUNT/UNLOAD command.

Immd: When set to "on," this parameter sets the IMMEDIATE bit in the SCSI STOP and START commands. You should turn this parameter "off" if you have a Sony optical disk drive connected to the Hawk. When set to "off," the VMS prompt will not return until the drive's media is ejected or the drive has spun down.

Shtm: When set to "on," this parameter enables the writing of short filemarks on Exabyte devices. When disabled ("off") all filemarks will be written as long filemarks.

Ftms: When set to "on," this parameter enables high speed forward and reverse filemark searching. This mode can increase tape drive performance, but it should not be used when you intend to boot VMS standalone backup.

Trnc: When this parameter is disabled ("off"), disks controlled by the Hawk will be compatible with other CMD Technology adapters. If you are not using other CMD adapters, turn truncation "on." This truncates the number of blocks to be divisible by 126 for faster VMS volume shadowing catch-up time.

Chapter 8

UTILIT

UTILIT Commands

This chapter assumes that you have already connected to the DUP server and selected the UTILIT program. If you have not already done this, see chapter 6.

HELP Command

You may enter the HELP command to receive a listing of all available UTILIT commands and their syntax. This is an example of the output from the HELP command.

```
UTILIT> HELP

HELP
SHOW                    [device_name] | [/ALL]
SELECT                   device_name
DESELECT                 device_name
ABORT                    device_name

- Disk Commands -
FORMAT                   device_name
QUALIFY                  device_name [/WRITE]
DISKTEST                 device_name [/WRITE]

- Tape Commands -
TAPETEST                 device_name

UTILIT>
```

The variable *device_name* stands for any valid MSCP/TMSCP device label. Examples of disk drive device labels would be DIA100 and DUA120. Device labels for tape devices begin with MU, such as MUA240.

SHOW Command

The result of the SHOW command is a listing of information about the *device_name* or all devices if the /ALL qualifier is specified.

```
UTILIT> SHOW
Device  SID  Vendor  Model  Rev    Dev Stat   Maint Oper  Maint Status
DUA220  2-0  DEC     RZ28   435E   MAINT      IDLE        READY

UTILIT> SHOW /ALL
Device  SID  Vendor  Model  Rev    Dev Stat   Maint Oper  Maint Status
DUA210  1-0  DEC     RZ28   435E   MAINT      DISKTEST    IN PROGRESS
DUA220  2-0  DEC     RZ28   435E   MAINT      IDLE        READY
MUA240  4-0  DEC     TLZ6   0491   AVAILABLE
MUA260  6-0  DEC     TLZ6   0491   MAINT      TAPETEST    IN PROGRESS
```

Table 8-1 describes the contents of each column in the SHOW output display.

■ **Table 8-1 SHOW Command Output**

Column	Description
Device	The MSCP or TMSCP device name
SID	The SCSI ID—LUN of the device
Vendor	The vendor's name, truncated to seven characters
Model	The device model name, truncated to seven characters
Rev	The manufacturer's revision code for the device firmware
Dev Stat	The current status of the device
Maint Oper	The UTILIT operation, if any, currently underway
Maint Status	The status of the current UTILIT operation

SELECT Command

Before you can perform a UTILIT operation on a device you must first SELECT it. The act of selecting a device changes its operational status to MAINT and renders it unavailable to the OpenVMS operating system.

Only devices listed as AVAILABLE by the SHOW command can be selected. Devices listed as OFFLINE or ONLINE cannot be selected.

The following example of the SELECT command begins with a SHOW command to illustrate the change that occurs to the "Dev Status" column.

SELECT Example

```
UTILIT> SHOW DUA220
Device SID Vendor Model Rev   Dev Stat  Maint Oper Maint Status
DUA220 2-0 DEC    RZ28  435E  AVAILABLE

UTILIT> SELECT DUA220
Device SID Vendor Model Rev   Dev Stat  Maint Oper Maint Status
DUA220 2-0 DEC    RZ28  435E  MAINT                READY
```

DESELECT Command

The DESELECT command returns a selected device to AVAILABLE status and allows the operating system to again access it.

DESELECT Example

```
UTILIT> SHOW DUA220
Device SID Vendor Model Rev   Dev Stat  Maint Oper Maint Status
DUA220 2-0 DEC    RZ28  435E  MAINT                READY

UTILIT> DESELECT DUA220
Device SID Vendor Model Rev   Dev Stat  Maint Oper Maint Status
DUA220 2-0 DEC    RZ28  435E  AVAILABLE
```

ABORT Command

The ABORT command terminates a QUALIFY, DISKTEST or TAPETEST operation. These operations normally run indefinitely or until stopped with the ABORT command or by shutting off power to the adapter.

ABORT Example

```
UTILIT> ABORT DUA220
UTILIT>
```

FORMAT Command

Use the FORMAT command to format a disk drive that has been selected with the SELECT command. Since the format operation will destroy any data on the disk drive, you will be prompted to confirm that you wish to proceed. If you respond with "N" or "NO," the format will be aborted with no affect on your data. Enter "Y" or "YES" to proceed with the format. Once initiated, the format operation cannot be aborted with the ABORT command.

FORMAT does not produce any message when the operation is completed. You should periodically issue the SHOW command to check on the status of the format. It is a good practice to run one or more QUALIFY passes on the drive after a format.

FORMAT Example

```
UTILIT> FORMAT DUA220

Device SID Vendor Model Rev  Dev Stat Maint Oper Maint Status
DUA220 2-0 DEC     RZ28 435E MAINT    IDLE       READY

FORMAT will destroy all data on this device. Are you sure (Y/N)? YES

UTILIT>
```

QUALIFY Command

The QUALIFY command will verify the readability of the media in a disk drive. If you use the /WRITE qualifier, the command also detects and replaces bad blocks on the media. Use the QUALIFY command by itself when you want to verify the integrity of a disk drive that already contains data, since the operation only reads from the disk drive. Use the QUALIFY command with the /WRITE qualifier on newly formatted drives for a more thorough test of the drive's integrity.

The /WRITE qualifer causes QUALIFY to write 32-kilobyte data chunks to the drive and then read them back. QUALIFY verifies the entire disk, block by block. When it reaches the final block it returns to the first block and repeats the process. This continues indefinitely until you stop the operation by issuing the ABORT command or by turning off power to the adapter.

You must SELECT a device before performing a QUALIFY operation on it.

QUALIFY Example

```
UTILIT> QUALIFY DUA220

Device SID Vendor Model Rev  Dev Stat Maint Oper Maint Status
DUA220 2-0 DEC     RZ28 435E MAINT               READY

QUALIFY will destroy all data on this device. Are you sure (Y/N)? YES

UTILIT>
```

DISKTEST Command

The DISKTEST command exercises the selected drive and corrects any media errors. During a DISKTEST /WRITE operation, the Hawk writes to randomly selected logical blocks on the device and then reads and verifies the data. If the device you want to test already contains data, omit the /WRITE qualifier, and DISKTEST will simply read from randomly selected logical blocks. For newly formatted devices, you must use the /WRITE qualifier, or else DISKTEST will have no data to read.

You must SELECT a device before running DISKTEST on it.

If DISKTEST encounters an error that it cannot correct, it will display a message describing the error condition.

DISKTEST will run indefinitely until you issue the ABORT command or turn off power to the adapter.

DISKTEST Example

```
UTILIT> DISKTEST DUA220

Device SID Vendor Model Rev  Dev Stat Maint Oper  Maint Status
DUA220 2-0 DEC    RZ28  435E MAINT    IDLE        READY

DISKTEST will overwrite some or all data on this device. Are you sure (Y/N)? YES

UTILIT>
```

TAPETEST Command

TAPETEST exercises the selected tape device by writing, rewinding and reading each section of tape, up to but not including filemarks. The block size for the initial write is 32 kilobytes. This is halved on each successive write/rewind/read operation. The test restarts when the block size reaches 1 kilobyte. TAPETEST will replace any media errors it discovers.

You must SELECT a device before running TAPETEST on it. Be sure that the tape device contains enough tape for 10 megabytes of 1 kilobyte blocks, otherwise TAPETEST will not work.

TAPETEST will run indefinitely until you stop the operation with the ABORT command or by turning off power to the adapter.

If TAPETEST encounters an error that it cannot correct, it will display a message describing the error condition.

TAPETEST Example

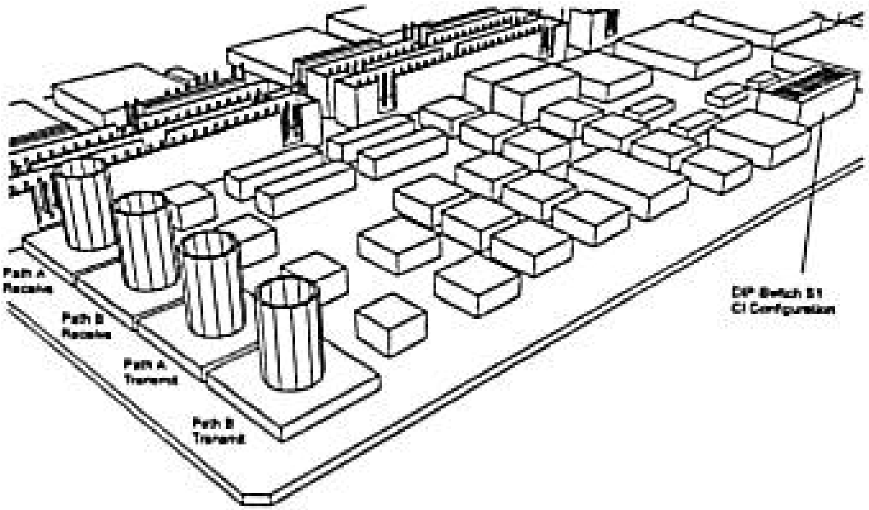
```
UTILIT> TAPETEST MUA260

Device SID Vendor Model Rev  Dev Stat Maint Oper  Maint Status
MUA260 6-0 DEC    TLZ6  0491 MAINT    IDLE        READY

TAPETEST will overwrite some or all data on this device. Are you sure (Y/N)? YES
Initiating Tape Test

UTILIT>
```

Appendix A

Board Configuration

CI Connector Locations

The CI ports on the Hawk are located at J5, J6, J7 and J8, as shown in the following illustration.



CI ports and CI configuration DIP switch

CI Configuration

The DIP switch at S1 controls the CI configuration of the Hawk.

CI Node

Switches one to five on S1 designate the Hawk's CI node. This must be set to a value unique among the other CI nodes in the VMS cluster.

■ Table A-1 CI Node Selection

Node	S1-1	S1-2	S1-3	S1-4	S1-5	Node	S1-1	S1-2	S1-3	S1-4	S1-5
0	ON	ON	ON	ON	ON	16	ON	ON	ON	ON	OFF
1	OFF	ON	ON	ON	ON	17	OFF	ON	ON	ON	OFF
2	ON	OFF	ON	ON	ON	18	ON	OFF	ON	ON	OFF
3	OFF	OFF	ON	ON	ON	19	OFF	OFF	ON	ON	OFF
4	ON	ON	OFF	ON	ON	20	ON	ON	OFF	ON	OFF
5	OFF	ON	OFF	ON	ON	21	OFF	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON	ON	22	ON	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	ON	ON	23	OFF	OFF	OFF	ON	OFF
8	ON	ON	ON	OFF	ON	24	ON	ON	ON	OFF	OFF
9	OFF	ON	ON	OFF	ON	25	OFF	ON	ON	OFF	OFF
10	ON	OFF	ON	OFF	ON	26	ON	OFF	ON	OFF	OFF
11	OFF	OFF	ON	OFF	ON	27	OFF	OFF	ON	OFF	OFF
12	ON	ON	OFF	OFF	ON	28	ON	ON	OFF	OFF	OFF
13	OFF	ON	OFF	OFF	ON	29	OFF	ON	OFF	OFF	OFF
14	ON	OFF	OFF	OFF	ON	30	ON	OFF	OFF	OFF	OFF
15	OFF	OFF	OFF	OFF	ON	31	OFF	OFF	OFF	OFF	OFF

The default CI Node number is 15.

CI Slot Count

Before taking control of a CI path, a node must pause for a specified interval to make sure that no other node is using the path. The length of this interval is governed in part by the CI slot count, which also goes by the names, "delta time," "quiet time" or "quiet slot." All CI nodes must be set to the same slot count value. On the Hawk, switches six and seven on S1 set the CI slot count.

■ Table A-2 CI Slot Count Selection

CI Slot Count	S1-6	S1-7
7	ON	ON
10 (default)	OFF	ON
14	ON	OFF
16	OFF	OFF

CI Node Count

The CI node count parameter also plays a role in the path arbitration algorithm. Count the number of CI nodes on the computer interconnect and set switch eight on S1 accordingly.

- **Table A-3 CI Node Count Selection**

CI Node Count	S1-8
1 to 16 nodes (def)	OFF
1 to 32 nodes	ON

CI Header Length

The default CI header length of five bytes is the standard value for CI installations. The option for a 15-byte length is provided for the purpose of compatibility with some CI adapters.

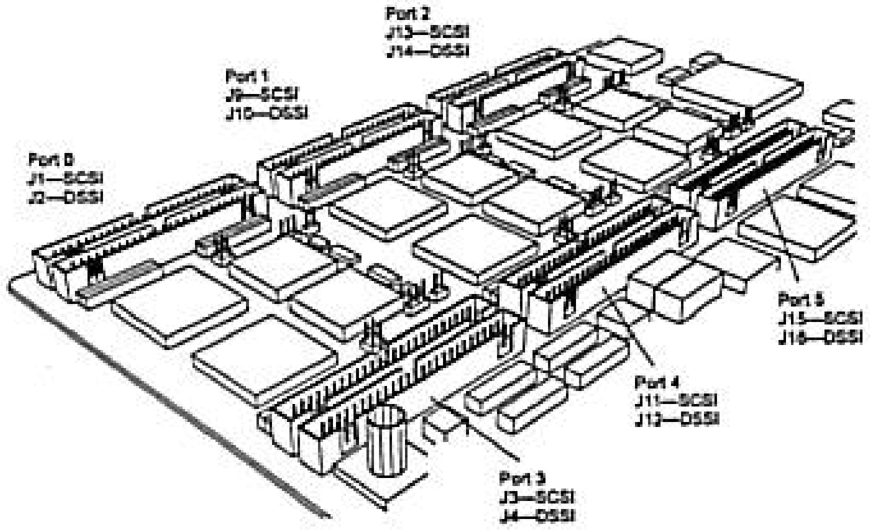
- **Table A-4 CI Header Length Selection**

CI Header Length	S1-9
5 bytes (def)	OFF
15 bytes	ON

DSSI-SCSI Port Configuration

The Hawk has six SCSI ports. (On the CSV-8100 you may convert one or more of the SCSI ports to DSSI. The conversion instructions in this appendix apply only to the CSV-8100.) Additionally, you may configure each port for on-board or external termination. The remainder of this section provides configuration settings for each port.

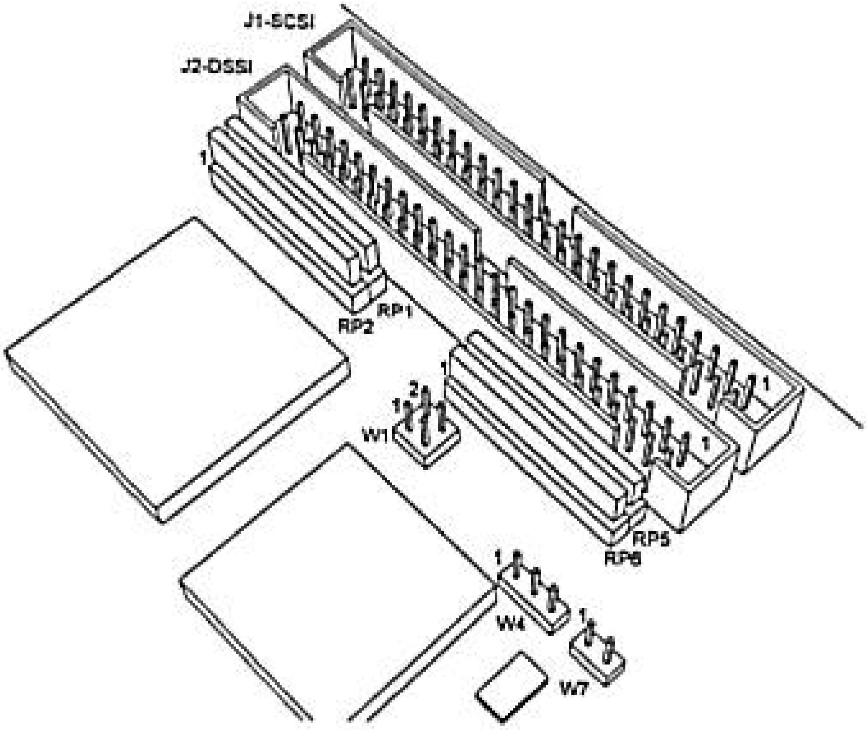
This appendix provides instructions for converting SCSI ports to DSSI ports. Please be advised that only the CSV-8100 supports such conversions and you may be limited in the number of ports you can convert to DSSI. The CSV-8000 supports only SCSI ports.



DSSI and SCSI ports

Port 0

If you select DSSI as the interconnect for Port 0, you must use connector J2. If you select SCSI, use connector J1. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings (see below for instructions).



Port 0

Port 0 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

■ **Table A-5 Port 0 SCSI Termination**

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP1	110 ohm resistor installed	RP1	Empty
RP2	Empty	RP2	Empty
RP5	110 ohm resistor installed	RP5	Empty
RP6	Empty	RP6	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ Table A-6 Port 0 DSSI Termination

On-Board Termination			External Termination		
Part		Status	Part		Status
RP1	IN	120 ohm resistor installed	RP1	OUT	Empty
RP2	IN	270 ohm resistor installed	RP2	OUT	Empty
RP5	IN	120 ohm resistor installed	RP5	OUT	Empty
RP6	IN	270 ohm resistor installed	RP6	OUT	Empty
W1 (1-2)	OUT	On-board termination used	W1 (1-2)	IN	External termination used
W1 (3-4)	OUT	On-board termination used	W1 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 0 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ Table A-7 Port 0 SCSI Term Power

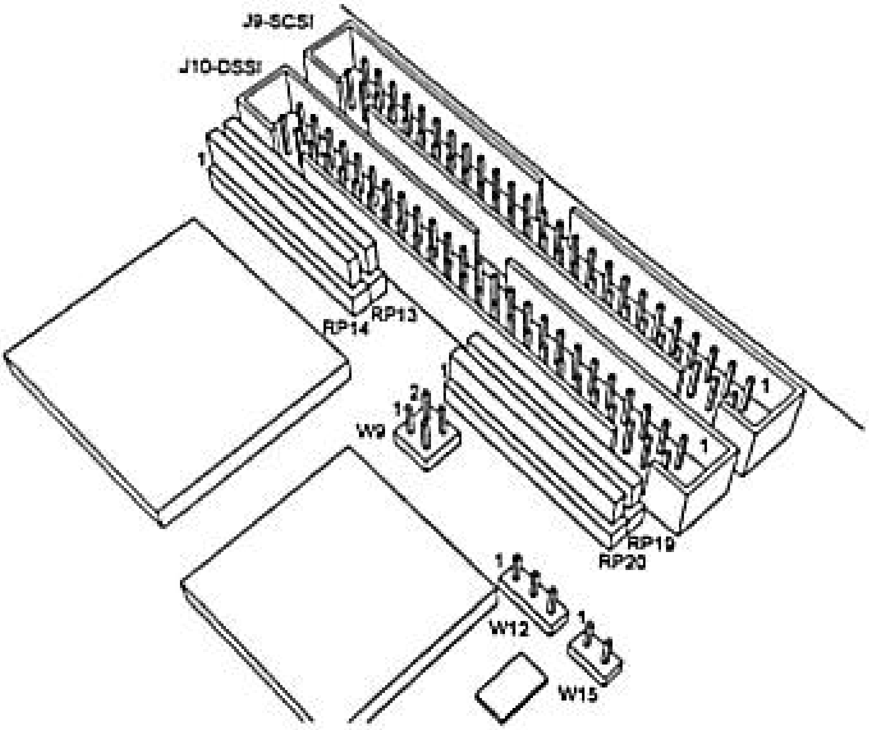
Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W4 (1-2)	IN	Term power directed to J1	W4 (1-2)		Not applicable
W7 (1-2)	IN	Term power supplied	W7 (1-2)	OUT	Term power not supplied

■ Table A-8 Port 0 DSSI Term Power

Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W4 (2-3)	IN	Term power directed to J2	W4 (2-3)		Not applicable
W7 (1-2)	IN	Term power supplied	W7 (1-2)	OUT	Term power not supplied

Port 1

If you select DSSI as the interconnect, you must use connector J10. If you select SCSI, use connector J9. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings (see below for instructions).



Port 1

Port 1 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

■ Table A-9 Port 1 SCSI Termination

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP13	110 ohm resistor installed	RP13	Empty
RP14	Empty	RP14	Empty
RP19	110 ohm resistor installed	RP19	Empty
RP20	Empty	RP20	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ Table A-10 Port 1 DSSI Termination

On-Board Termination			External Termination		
Part		Status	Part		Status
RP13	IN	120 ohm resistor installed	RP13	OUT	Empty
RP14	IN	270 ohm resistor installed	RP14	OUT	Empty
RP19	IN	120 ohm resistor installed	RP19	OUT	Empty
RP20	IN	270 ohm resistor installed	RP20	OUT	Empty
W9 (1-2)	OUT	On-board termination used	W9 (1-2)	IN	External termination used
W9 (3-4)	OUT	On-board termination used	W9 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 1 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ Table A-11 Port 1 SCSI Term Power

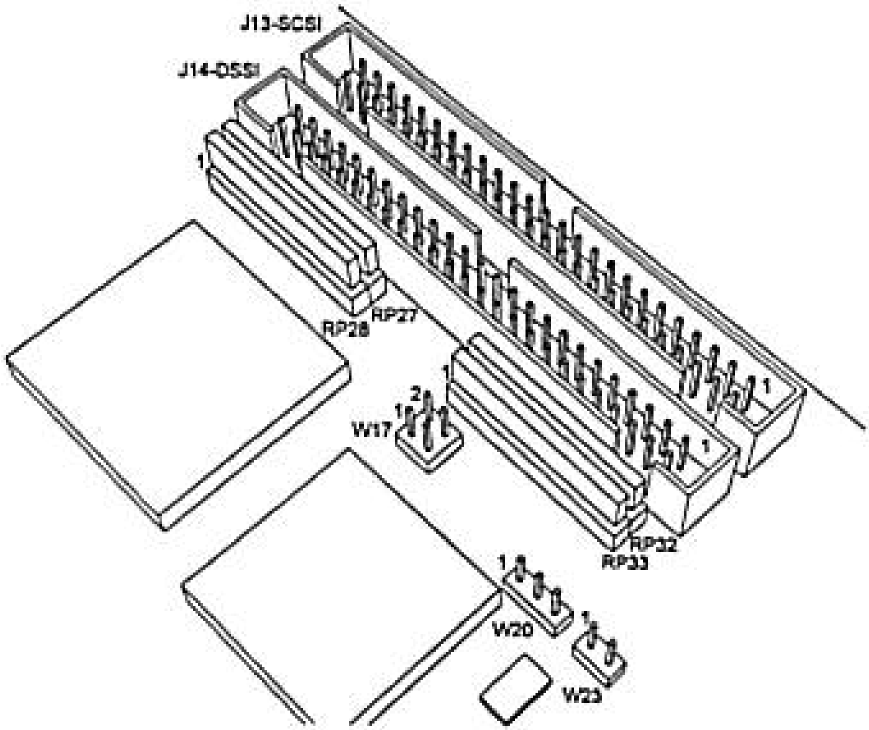
Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W12 (1-2)	IN	Term power directed to J9	W12 (1-2)		Not applicable
W15 (1-2)	IN	Term power supplied	W15 (1-2)	OUT	Term power not supplied

■ Table A-12 Port 1 DSSI Term Power

Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W12 (2-3)	IN	Term power directed to J10	W12 (2-3)		Not applicable
W15 (1-2)	IN	Term power supplied	W15 (1-2)	OUT	Term power not supplied

Port 2

If you select DSSI as the interconnect, you must use connector J14. If you select SCSI, use connector J13. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings.



Port 2

Port 2 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

- **Table A-13 Port 2 SCSI Termination**

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP27	110 ohm resistor installed	RP27	Empty
RP28	Empty	RP28	Empty
RP32	110 ohm resistor installed	RP32	Empty
RP33	Empty	RP33	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ Table A-14 Port 2 DSSI Termination

On-Board Termination			External Termination		
Part		**Status**	**Part**		**Status**
RP27	IN	120 ohm resistor installed	RP27	OUT	Empty
RP28	IN	270 ohm resistor installed	RP28	OUT	Empty
RP32	IN	120 ohm resistor installed	RP32	OUT	Empty
RP33	IN	270 ohm resistor installed	RP33	OUT	Empty
W17 (1-2)	OUT	On-board termination used	W17 (1-2)	IN	External termination used
W17 (3-4)	OUT	On-board termination used	W17 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 2 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ Table A-15 Port 2 SCSI Term Power

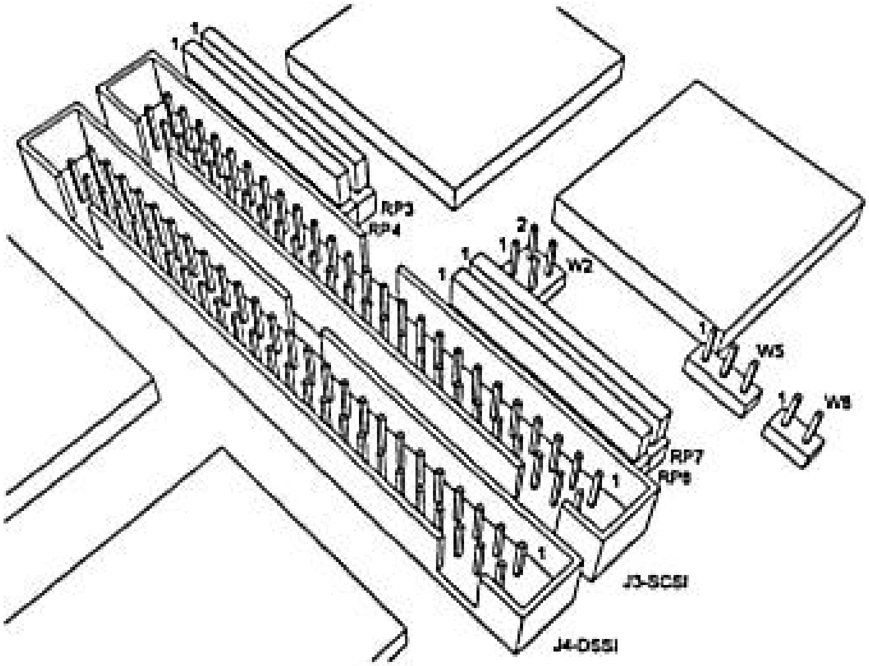
Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W20 (1-2)	IN	Term power directed to J13	W20 (1-2)		Not applicable
W23 (1-2)	IN	Term power supplied	W23 (1-2)	OUT	Term power not supplied

■ Table A-16 Port 2 DSSI Term Power

Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W20 (2-3)	IN	Term power directed to J14	W20 (2-3)		Not applicable
W23 (1-2)	IN	Term power supplied	W23 (1-2)	OUT	Term power not supplied

Port 3

If you select DSSI as the interconnect, you must use connector J4. If you select SCSI, use connector J3. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings.



Port 3

Port 3 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

■ Table A-17 Port 3 SCSI Termination

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP3	Empty	RP3	Empty
RP4	110 ohm resistor installed	RP4	Empty
RP7	Empty	RP7	Empty
RP8	110 ohm resistor installed	RP8	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ Table A-18 Port 3 DSSI Termination

On-Board Termination			External Termination		
Part		**Status**	**Part**		**Status**
RP3	IN	270 ohm resistor installed	RP3	OUT	Empty
RP4	IN	120 ohm resistor installed	RP4	OUT	Empty
RP7	IN	270 ohm resistor installed	RP7	OUT	Empty
RP8	IN	120 ohm resistor installed	RP8	OUT	Empty
W2 (1-2)	OUT	On-board termination used	W2 (1-2)	IN	External termination used
W2 (3-4)	OUT	On-board termination used	W2 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 3 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ Table A-19 Port 3 SCSI Term Power

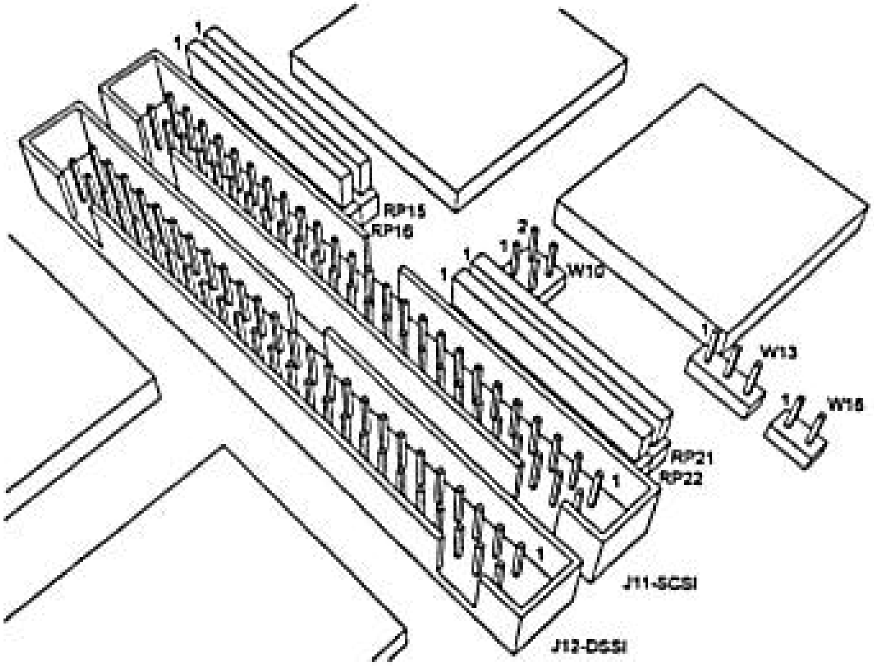
Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W5 (1-2)	IN	Term power directed to J3	W5 (1-2)		Not applicable
W8 (1-2)	IN	Term power supplied	W8 (1-2)	OUT	Term power not supplied

■ Table A-20 Port 3 DSSI Term Power

Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W5 (2-3)	IN	Term power directed to J4	W5 (2-3)		Not applicable
W8 (1-2)	IN	Term power supplied	W8 (1-2)	OUT	Term power not supplied

Port 4

If you select DSSI as the interconnect, you must use connector J12. If you select SCSI, use connector J11. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings.



Port 4

Port 4 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

■ **Table A-21 Port 4 SCSI Termination**

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP15	Empty	RP15	Empty
RP16	110 ohm resistor installed	RP16	Empty
RP21	Empty	RP21	Empty
RP22	110 ohm resistor installed	RP22	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ **Table A-22 Port 4 DSSI Termination**

On-Board Termination			External Termination		
Part		**Status**	**Part**		**Status**
RP15	IN	270 ohm resistor installed	RP15	OUT	Empty
RP16	IN	120 ohm resistor installed	RP16	OUT	Empty
RP21	IN	270 ohm resistor installed	RP21	OUT	Empty
RP22	IN	120 ohm resistor installed	RP22	OUT	Empty
W10 (1-2)	OUT	On-board termination used	W10 (1-2)	IN	External termination used
W10 (3-4)	OUT	On-board termination used	W10 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 4 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ **Table A-23 Port 4 SCSI Term Power**

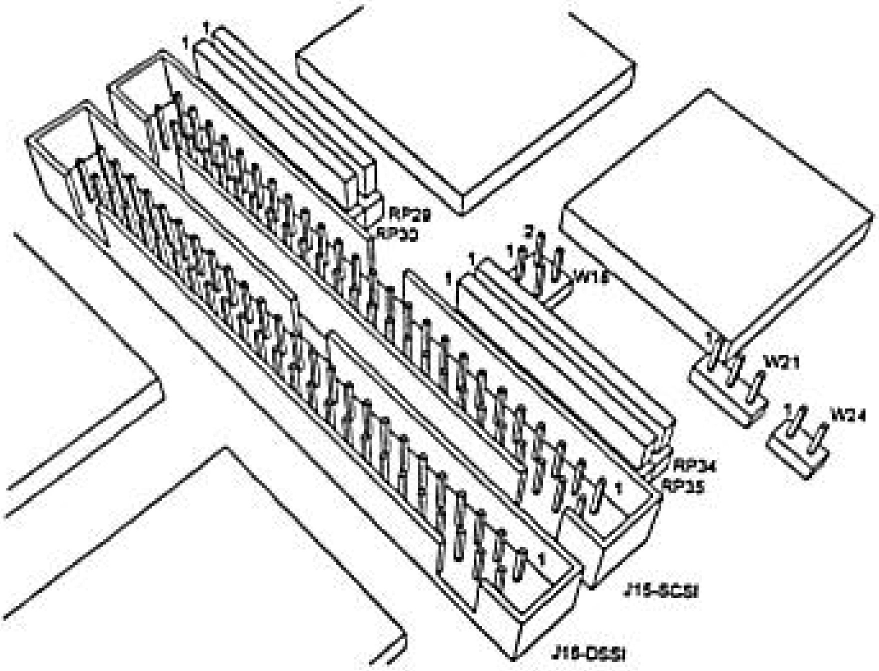
Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W13 (1-2)	IN	Term power directed to J11	W13 (1-2)		Not applicable
W16 (1-2)	IN	Term power supplied	W16 (1-2)	OUT	Term power not supplied

■ **Table A-24 Port 4 DSSI Term Power**

Term Power Supplied			Term Power Not Supplied		
Jumper		**Status**	**Jumper**		**Status**
W13 (2-3)	IN	Term power directed to J12	W13 (2-3)		Not applicable
W16 (1-2)	IN	Term power supplied	W16 (1-2)	OUT	Term power not supplied

Port 5

If you select DSSI as the interconnect, you must use connector J16. If you select SCSI, use connector J15. Edit the port configuration file on the floppy boot-up diskette to activate the DSSI or SCSI connector and set the ID and other parameters for the port (see page 3-6). If you wish to use on-board termination or disable term power from the Hawk, you must change the board's default settings.



Port 5

Port 5 Termination

The Hawk's termination options vary according to whether you have selected DSSI or SCSI and whether you opt for on-board or external termination. The following tables will guide you through the various options.

■ Table A-25 Port 5 SCSI Termination

On-Board Termination		External Termination	
Socket	**Status**	**Socket**	**Status**
RP29	Empty	RP29	Empty
RP30	110 ohm resistor installed	RP30	Empty
RP34	Empty	RP34	Empty
RP35	110 ohm resistor installed	RP35	Empty

If you use the Hawk's on-board termination, be sure to use active termination on the other end of the SCSI bus. Do not use passive termination. (You may use an alternative form of high-quality termination, such as force perfect termination, if you prefer.)

■ Table A-26 Port 5 DSSI Termination

On-Board Termination			External Termination		
Part		Status	Part		Status
RP29	IN	270 ohm resistor installed	RP29	OUT	Empty
RP30	IN	120 ohm resistor installed	RP30	OUT	Empty
RP34	IN	270 ohm resistor installed	RP34	OUT	Empty
RP35	IN	120 ohm resistor installed	RP35	OUT	Empty
W18 (1-2)	OUT	On-board termination used	W18 (1-2)	IN	External termination used
W18 (3-4)	OUT	On-board termination used	W18 (3-4)	IN	External termination used

The CSV-8100 uses passive termination for DSSI.

Port 5 Term Power

At least one node on a SCSI or DSSI interconnect must supply term power. Ideally, the nodes at each end of the interconnect should supply term power. You may configure the Hawk to supply term power or not to supply term power. The following tables show how.

■ Table A-27 Port 5 SCSI Term Power

Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W21 (1-2)	IN	Term power directed to J15	W21 (1-2)		Not applicable
W24 (1-2)	IN	Term power supplied	W24 (1-2)	OUT	Term power not supplied

■ Table A-28 Port 5 DSSI Term Power

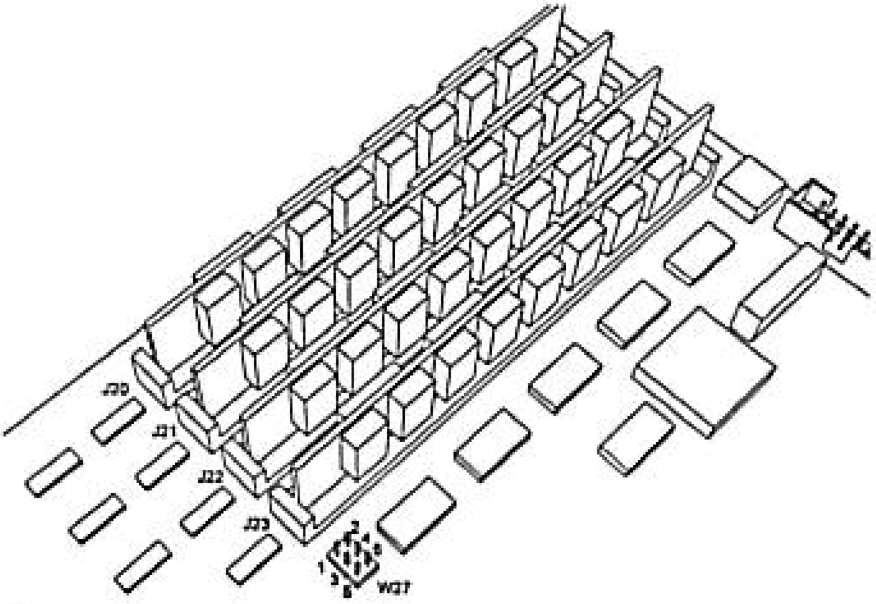
Term Power Supplied			Term Power Not Supplied		
Jumper		Status	Jumper		Status
W21 (2-3)	IN	Term power directed to J16	W21 (2-3)		Not applicable
W24 (1-2)	IN	Term power supplied	W24 (1-2)	OUT	Term power not supplied

Other Jumper Settings

This section describes the remaining jumpers on the Hawk.

Cache Size

The Hawk's cache accepts standard 36-bit, 72-pin, 70-nanosecond SIMMs. The connectors for the modules are located at J20 through J23. You may install four-, eight- or 16-megabyte modules, as long as all modules are identical. Begin installing modules in J20 and work your way up to J23. There is no need to "pack" all four sockets. You may install one module, two modules, three modules or four modules. The Hawk will accept 32-, 64- and 128-megabyte modules as they become available.



Cache sockets and jumper W27

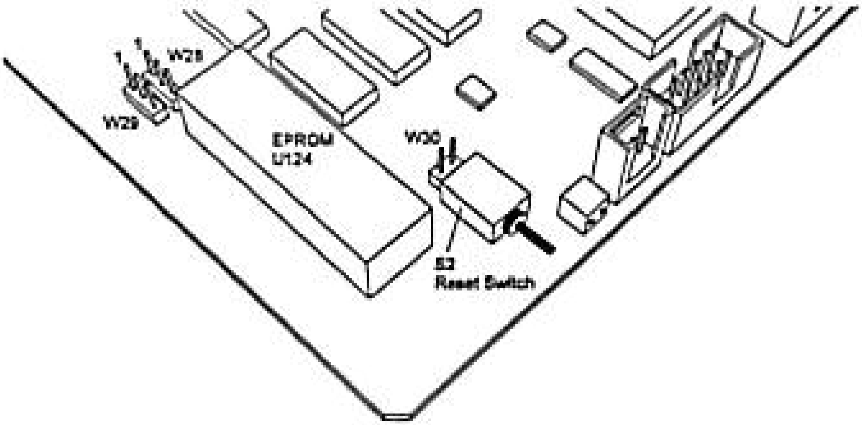
Jumper W27 specifies the size of the individual modules installed in the cache. This should not be confused with the total size of the cache.

■ Table A-29 Cache Module Size

Module Size	W27 (1-2)	W27 (3-4)	W27 (5-6)
4 MB	IN	IN	IN
8 MB	OUT	OUT	IN
16 MB	IN	OUT	OUT
32 MB	OUT	IN	OUT
64 MB	IN	IN	OUT
128 MB	OUT	OUT	OUT

EPROM Size

Jumpers W28 and W29 tell the Hawk what size EPROM to look for in position U124. The "EPROM Size Selection" table shows the possible settings.



EPROM, jumpers W28 and W29 and reset switch

■ Table A-30 EPROM Size Selection

EPROM Size	W28 (1-2)	W28 (2-3)	W29 (1-2)	W29 (2-3)
128kb or 256kb (def)	OUT	IN	OUT	IN
512kb	IN	OUT	OUT	IN
1mb	IN	OUT	IN	OUT

Manual Reset

Pressing the button on the switch at S2, causes the board to reset without going through a power cycle. You may also cause a reset by shorting the two pins at jumper W30.

Reserved Jumpers

The following jumpers are reserved and have no function at this time.

■ **Table A-31 Reserved Jumpers**

Jumper (Pins)	Status	Jumper (Pins)	Status
W3 (1-2)	Reserved	W14 (1-2)	Reserved
W3 (3-4)	Reserved	W14 (3-4)	Reserved
W6 (1-2)	Reserved	W19 (1-2)	Reserved
W6 (3-4)	Reserved	W19 (3-4)	Reserved
W11 (1-2)	Reserved	W22 (1-2)	Reserved
W11 (3-4)	Reserved	W22 (3-4)	Reserved

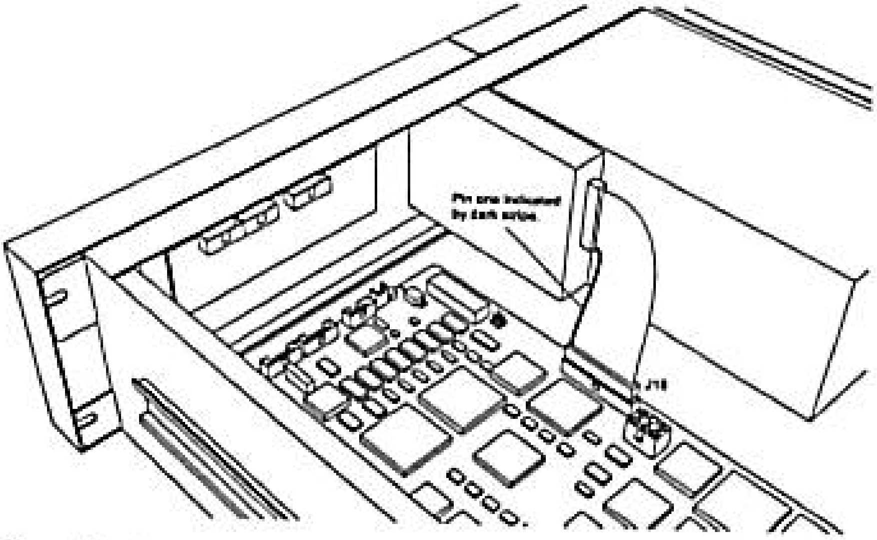
Appendix B

Floppy Drive

Connecting the Drive

The Hawk uses a standard PC-compatible floppy disk drive to load firmware code and configuration information from a 3.5-inch, high-density diskette formatted by DOS. When your Hawk is shipped, its floppy drive will be properly connected and ready for operation. If you later need to disconnect the floppy drive for whatever reason, please take the following steps.

- ☐ With power turned off, connect the floppy disk drive to the power supply.
- ☐ Connect the data cable to connector J19 on the Hawk board. Be sure to properly align pin 1, as the following illustration shows.



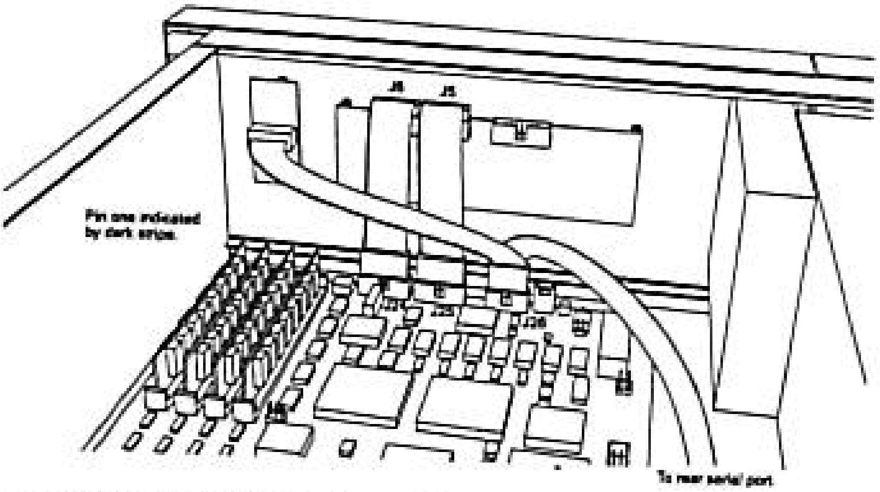
Connecting the floppy drive

Appendix C

Display Connections

Front Panel Connections

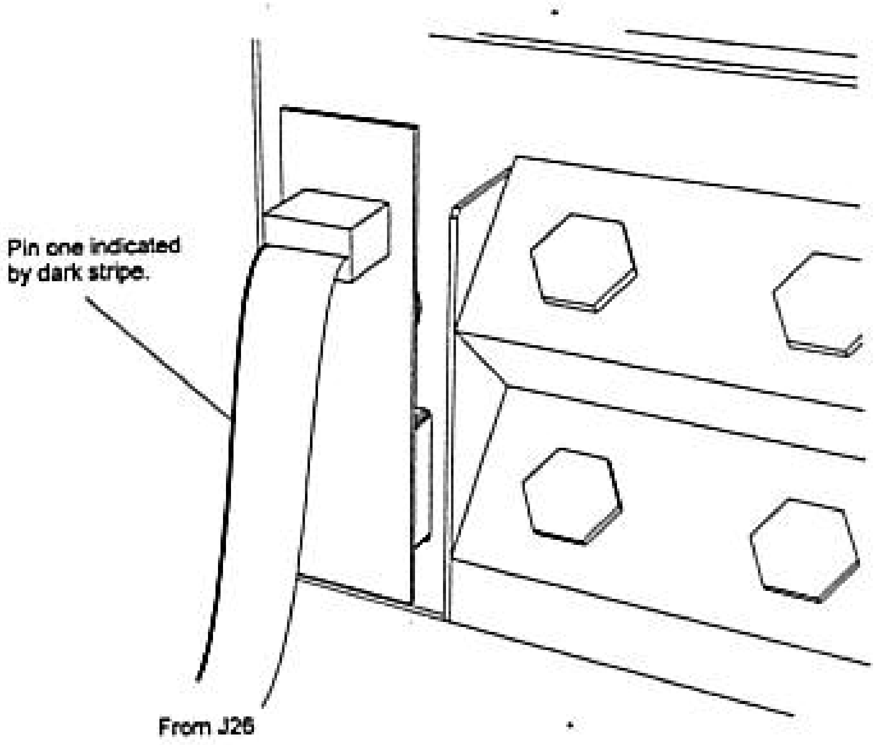
The front-panel display is connected to the Hawk board by two cables. One cable runs from connector J5 on the back of the front panel to connector J24 on the Hawk board. The other runs from connector J6 on the back of the front panel to connector J25 on the Hawk. The pin-1 alignment of both cables is shown in the following illustration.



Front panel and front serial port connections

Serial Port Connections

The Hawk has two serial ports—one on the front and one on the back of the enclosure —for communicating with an external terminal. The above illustration shows how to run a cable from the front port to connector J26 on the Hawk board. This same cable branches at J26 and runs to the rear of the enclosure, where it attaches to the other serial port as follows.



Rear serial port connection

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